

Warfare Information Board

CANADA AT WAR

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The Cover: Standing watch on the bridge of the merchantman, a captain in Canada's Merchant Navy portrays the fidelity of this growing industry which doggedly carries the sinews of war to the allied fronts.

CANADA AT WAR is a fact
of basic information
material for
or

The Fourth Fighting Arm

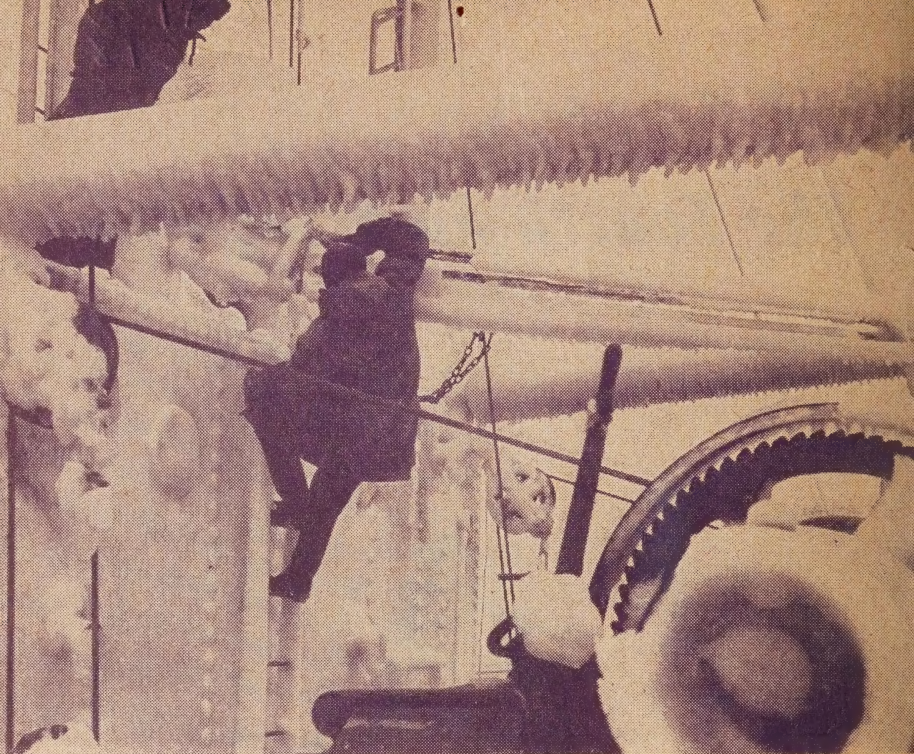
SINCE the outbreak of war ships of Canada's Merchant Navy, manned by Canadian merchant seamen, have been shuttling back and forth to the United Kingdom and allied war fronts of the world. They have helped in the all-important task of transporting tanks, war vehicles, aircraft, vital war metals, munitions and other supplies required to build up the huge reserves which have made possible the concentrated and sustained weight of the allied attacks in Normandy, Italy, Burma and other fronts. Likewise, Canada's contribution to Russia under the mutual aid agreement has played



no insignificant part in the remarkable advances by the Russian armies on the eastern European battlefront. All such commodities have had to be transported across the Atlantic or Pacific in the face of concentrated attacks by enemy submarines and bombing aircraft. Men of this un-uniformed service

have doggedly maintained these lifelines, shared in the evacuations of Dunkirk, Greece and Crete, aided in the establishment of beachheads in Mediterranean war theatres and pushed through to northern Russia.

No records are yet available as to the participation in the in-



Aboard a Canadian merchantman seamen battle bitter temperatures on Atlantic.

vasion of Normandy of Canadian merchant vessels. Nevertheless, some Canadian merchant seamen serving on United Kingdom merchant vessels undoubtedly have taken and still are taking part in these operations as they did in the invasion of North Africa, Sicily and Italy. All seamen serving on such ships were invited to volunteer for invasion duties. The identity

certificates of such volunteers were endorsed with the letter "V" and every man who was given the opportunity offered his services to the tremendous task of D-day shipping operations.

The volume of Canada's contribution to the allied merchant navies can only be appreciated when it is realized what one of Canada's new merchant vessels

—and there are now more than 100 in active operation—can carry in one trip. One ship, for example, left a Canadian port loaded to the plimsoll line with enough motor transports to equip one battalion of infantry; several thousand tons of vital war metals including enough aluminum to manufacture 640 fighter aircraft; 1000 tons of bombs; enough food to feed an army of 25,000 for one week; lumber for re-building damaged areas; and a few landing boats chained to the deck.

Growth of Merchant Navy

The phenomenal growth of the Canadian Merchant Navy, made possible by the concentrated efforts of Canadian shipyards as well as Canada's ability to supply crews of experienced officers and seamen, has been one of the outstanding features of the nation's extensive war effort. Canada has been able to provide all the ratings required on these new Canadian-built freighters and more than 60% of the officers required. By an arrangement entered into with the government of the United Kingdom a number of senior British officers have been lent to help man Canada's rapidly

expanding merchant navy.

The growth of the personnel of the Canadian Merchant Navy since the outbreak of the war has been great. This has been accomplished by the training of more than 1,500 young Canadians as deck and engineroom ratings. Experienced seamen are up-graded and, where possible, provided with tuition to take government examinations for certificates of competency as junior officers. Likewise, junior officers have been encouraged to sit for examination for senior posts. In addition, a number of Canadian officers, serving in the United Kingdom and allied mercantile marines, have returned to Canada to serve on Canadian vessels. Many retired officers and seamen have volunteered for sea duty as their war effort.

Training Schools

Numerous young Canadians who have passed through the government training schools and who have experienced the thrills of a sea voyage on a merchantman for the first time write back that they wish to adopt seafaring as a life career. From Murmansk to Ceylon they tell of their adventures and experiences on the seven seas. One seaman



At St. Margaret's Training School for Merchant Navy, men learn seamcraft on "Bluenose," land facsimile of ship,— become familiar with fender equipment, climbing ratlines, knots, signalling.

wrote of meeting a former school chum in Bombay. Another who has now been at sea for one year wrote from Australia telling of his shipmates who like himself trained at one of Canada's schools for merchant seamen.

The writers of these letters have all passed through the St. Margaret's Sea Training School for deckhands at Hubbards, Nova Scotia, or the Marine Engineering Instructional School for engineroom ratings at Pres-

cott, Ontario. A few of the most promising trainees are selected and given the opportunity of joining a ship as cadet officers.

Pensions and Compensations

The civilian status of Canadian merchant seamen, even though they share many of the dangers of their comrades in arms of the army, air force and navy, has precluded them from enjoying many of the advantages obtained by the armed forces.

However, they are virtually a fourth arm of the fighting services and many benefits comparable to those obtainable by the personnel of armed forces have been provided.

Pensions are provided for merchant seamen who, by reason of disabilities incurred through enemy action, are unable to continue in their chosen profession. Rehabilitation facilities similar to those offered to the armed forces are available to these disabled men.

Dependents of merchant seamen who lose their lives as a result of enemy action are taken care of under the all-covering pension scheme of the Canadian Pension Commission. Similarly, in cases of Canadian merchant seamen who are taken prisoners

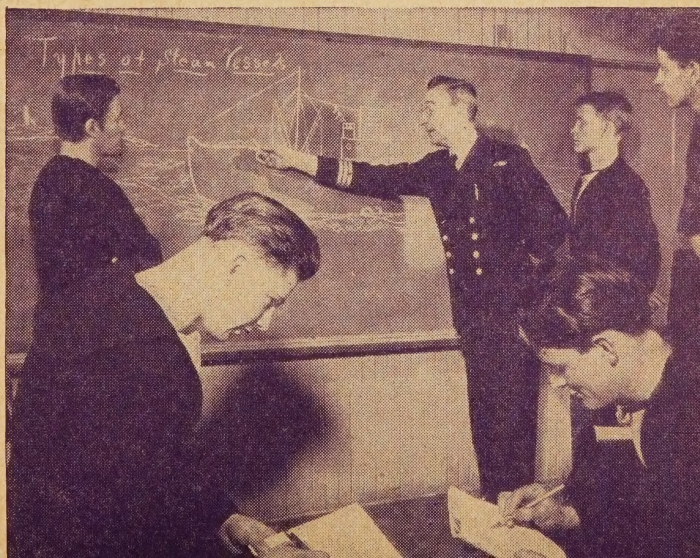
of war or held in enemy detention camps, continuation of the seaman's allotment to his dependents is assured.

Inasmuch as each merchant seaman supplies his own clothing, the Department of Transport, through a special wartime branch under a director of merchant seamen, provides for payment of compensation claims for loss of personal effects through enemy action.

An all-covering hospitalization scheme is in effect which provides for free hospitalization and medical treatment of seamen serving on Canadian ships in cases of sickness or injury suffered during the performance of their duties or as a result of enemy action.

Recently, by an order-in-coun-

Preparatory to
joining
Merchant Navy,
a class at
St. Margaret's
School,
Nova Scotia,
learns
ship types.



cil, additional benefits have been provided for Canadian merchant seamen who volunteer to serve in the Canadian Merchant Navy for the duration of the war or for a period of two years. Under this scheme, a yearly bonus of 10% of all earnings is provided, a yearly holiday with pay, and a trip home at reduced rail fare.

Manning Pools

The focal point in the whole scheme for providing necessary crews for manning new ships and for providing crew replacements is the manning pools where officers and seamen are provided with board, lodging and basic pay while awaiting assignment to a ship. Such manning pools have been established at Halifax, Saint John, Montreal and Vancouver. In cases where the homes of officers or seamen are located in the vicinity, provision has been made to enable them to live at home until called.

Through the manning pools the director of merchant seamen is now handling a very large number of Canadian officers and seamen. Whereas at one time the manning pools accommodated larger numbers of seamen from the United Kingdom, as-

sembled in Canada to man ships built at the order of the United Kingdom, the situation is now reversed, and now, because of the expansion of the Canadian fleet, the majority of the pool occupants are Canadian seamen.

Casualties and Awards

The toll of war has been heavy among Canadian merchant seamen. Recently Transport Minister J. E. Michaud said:

"With the vital importance of ocean supply lines the ruthless attempts of our enemies to destroy our merchant vessels have continued since the outbreak of hostilities. While present losses are light, Canadian shipping suffered very many casualties before the U-boats were mastered. Even though we entered the war with very few ocean-going vessels under Canadian registry, 628 Canadian seamen have lost their lives while serving on Canadian ships; some 200 more while serving on United Kingdom ships, and others while in service on ships of allied nations."

Although not classed as combatants, merchant seamen continuously come into conflict with enemy forces. A number of Canadian seamen have received decorations for their heroic conduct and valiant service at sea. In all, 17 officers and men serving on Canadian merchant vessels have received the award of the Order of the British Empire,

17 the Member of the British Empire, seven the British Empire Medal and three received commendation. Other Canadian seamen have received awards for their service on ships of allied nations.

Welfare

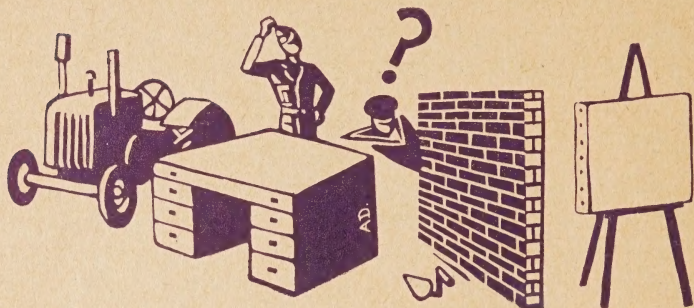
The welfare of merchant seamen in Canadian ports is looked after by existing seamen's clubs and hostels and has assumed large proportions. This is virtually all taken care of by private enterprise under the supervision of the Department of Transport. For instance, the

Navy League of Canada has established 17 clubs at various Canadian ports, where facilities are given for recreation, entertainment and welfare of merchant seamen of allied nations. The Canadian Red Cross Society, the Imperial Order Daughters of the Empire, Women's Naval Auxiliaries, Seamen's Fur Vest Project, Salvation Army, and other voluntary organizations contribute large quantities of ditty bags, woollen comforts and similar articles which are distributed to seamen either serving on ships or passing through the manning pools.

A cadet in the Merchant Navy serves a chilly watch on board a Canadian-built vessel— with him are sailing ship veterans and young seamen who have been torpedoed twice since war began.



CHOOSING A POST-WAR JOB



“WHAT about my future? What is the government going to do for me? Will I be able to get a job when I get out of uniform? What kind of a job can I get?”

Educational officers in all three armed services say that these are the questions most frequently asked when debates, discussions or even just plain arguments are in progress. The service man and woman is concerned about his own personal post-war plans. Some of them feel that their years in service have handicapped them in competing for post-war jobs—that while they were winning the war, others at home were gaining the experience and training that will

assure them preferred spots on the employment lists.

Viewed merely as a problem of morale, this anxiety merits special treatment. As a therapeutic factor during convalescence after being ill or wounded, the resolution of personal worries is important; and, if the service man's contention is right, if his service experience has actually handicapped him in the labour market, there is even more reason to consider it.

This the three services have done, and one of them has already planned a concrete, detailed program. Since June 1, 1944, the air force has been using a scientific method of vocational guidance which it calls person-

nel counselling. The other two services are also working on the question of preparing their personnel for civilian life, but as most of them are either preparing for battle or actually engaged in fighting, the problem is not so acute, and it is felt that it is better to wait until they have been posted for discharge before assisting them to concentrate on their civilian problems.

Personnel counselling offers assessment, information and assistance to service men and women to enable them to train themselves, while still in uniform, for the post-war career for which they are best fitted by personal aptitude, experience and background, interest and inclination and training acquired in the service, plus training received for that career in spare time.

The advisor is a personnel counsellor—an officer specially chosen for his or her experience and ability and trained to use the scientific technique of vocational guidance. The counsellor considers the service man's record, his educational and personal background, his history of employment. He finds out what the man would like to do, what

he does best. Provided with charts of occupational classifications, booklets describing occupations, employment surveys and a general knowledge of labour legislation as well as of the rehabilitation measures open to veterans of the war, the counsellor is able to guide the man away from jobs which will be too difficult for him, for which he is not suited in any of a number of ways, and into some kind of career in which the opportunities of employment, promotion and satisfaction are greatest.

Every Royal Canadian Air Force recruit took two basic tests on enlisting—of intellectual and mechanical abilities, with special emphasis on ability to learn. R.C.A.F. personnel counsellors use his marks on these tests as part of his assessment.

The air force already has more than 100 personnel counsellors at work. A group has gone overseas, and more will follow. Special efforts are being made to reach more isolated small groups, because they may worry more about their futures than those who are in nearer touch with home. A counsellor will be posted to every station where there are at least 400 permanent personnel, and smaller stations will

share a visiting counsellor. Where a number of women are stationed, a Women's Division counsellor will be posted.

Navy "hobby lobby" huts, already established as handicraft centres at convalescent hospitals, will be tied in with the navy's program, and, if necessary, their office of engineering personnel will provide equipment for certain types of training.

Once the service man or woman has picked the job for which he and his counsellor feel he is best fitted and in which he has the best chance of success in civilian life, he is turned over to the education officer. Very few air force trades have exact equivalents in civilian employment, and therefore it is the rule, rather than the exception, that further training or education is necessary before the aspirant for his chosen career is ready to step into a peacetime job. This further training is available through education and training officers. Classroom or correspondence courses may be taken through the Canadian Legion Educational Services or through the service's directorate of education. They include primary and secondary school and university courses, technical, trades and

agricultural courses, and their standards are accepted throughout Canada. They are either free or at a nominal cost.

On discharge, the services are considering a plan to provide their personnel with documents on booklets of introduction to prospective employers. Each book reviews a man's or woman's service career in terms of experience, training and degree of success; indicates the career for which he has been counselled; and shows what additional studies he has undertaken while still in the service.

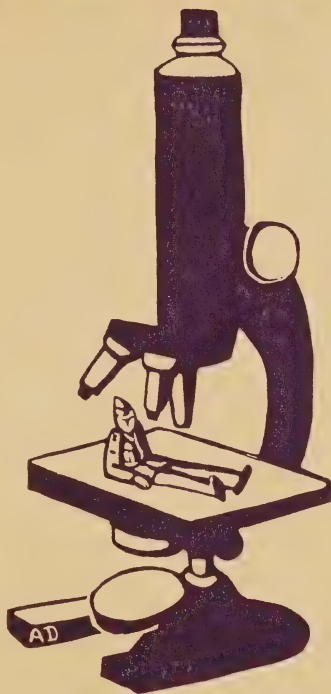
If jobs are available, it is felt that those who have done something about preparing for them are the ones who will have the best chances. Nobody who has had the benefit of personnel counselling and special facilities for additional training need feel handicapped alongside his civilian brother who has not had his career thus guided. The object of this counselling is to demobilize men and women equipped not merely with a better-than-average chance of finding a job, but with a better-than-average chance of finding a job suited to them individually which offers some prospects of security, satisfaction and promotion.

Aviation Medicine

CANADA has trained more than 200,000 air force personnel under the British Commonwealth Air Training Plan at least half of whom are highly skilled air crew members. This tremendous contribution to allied hitting power has been the result of energy and intelligence applied in a constant yet successful race against time. Royal Canadian

Air Force personnel—whether air crew, ground crew or instruction staff—has to have the best equipment and the most important part of that equipment is physical and mental health.

Aviation medicine then, while assuming the role of a new medical specialty, is in its most practical form simply the practice of medicine applied to the



selection and maintenance of personnel engaged in the business of flying aircraft.

Selection begins at recruiting centres and, particularly in air crew, continues throughout the service career. All air crew trainees are re-examined approximately 10 weeks after initial entry by special medical boards either at initial training or wireless

schools. In addition, re-examination of air or ground crew personnel is carried out on every occasion where there is a possibility that medical category may have been altered. More than 75% of initial applicants are successful. However, selection of air crew goes far beyond this single stage of medical examination and includes many special

selection steps. The navigator, pilot, air gunner, wireless operator, all have specific duties to perform in the air, hence standards vary for different air crew trades. For instance, one man might be able to sustain high altitudes well but be low in night vision capacity. Thus selection within previously selected groups must be carried out.

Vision in the Air Force

In the selection of air crew, eye characteristics are more important than any other single factor—whether the airman be pilot, gunner or navigator he must meet certain minimum requirements after which his particular job in air crew is determined by his visual qualifications.

Of the number of recruits accepted into the service as physically fit 10 to 14 % are rejected for air crew because of their eyes. A gunner needs visual acuity—the sharpness to see and recognize small objects in space. Because of instrumental aids he does not require depth perception of the highest order. A pilot, on the other hand, needs above all else perfect co-ordination of both eyes to be able to tell his position in space. A

navigator does well with normally good vision as he usually works from maps and charts. Within these broad lines are many shades and variations upon which air crew are assessed and finally selected. Many studies were carried out to arrive at these performance specifications and to correlate actual flying needs with certain human limitations.

In this process several previously accepted standards were scrapped as inadequate. For instance, early in the war the projection method was adopted as a means of measuring visual acuity. By this means the letters for testing vision are projected on a screen by lantern thus permitting standardized illumination. Hence uniformity of testing was attained where it had been impossible with the old "Snellen's" wall charts. Similarly, the Maddox Rod replaced the Red-Green Box in the testing of two-eye co-ordination because it was found that the former gave more uniform results, especially in the hands of unskilled operators.

Contrary to the traditional view it was found that in many cases where one eye was stronger than the other and the two eyes

did not co-ordinate properly certain mental compensations made it possible for this airman to fly sufficiently accurately. Instead of gaining his depth perception through eye co-ordination he achieved it by the size of objects, perspective and motion parallax (to the moving observer near objects appear to move against his direction and farther ones with his direction).

Other tests showed that a person with "hypermetropia" or far sight is limited by the extra eye strain imposed by flying, as under certain conditions of very high or very low altitudes this type of eye fatigues easily.

Another important study has indicated that color vision of a high degree is required for safe flying. Extensive tests with color signalling devices such as flares and Aldis lamps have been carried out at an experimental vision range. As 9% of all males are color defective this deficiency becomes an important factor in the selection of air crew.

Night Vision

Night flying being such a vital part of the airman's actual war participation, a great deal of research has been carried out. In winter this work was done in

laboratories but true lifelike conditions had to be met out-of-doors. The problem was to select an area where such authentic night conditions existed and where there was no sky lume from nearby cities. Thus a range was set up at Domaine d'Esterel, high in Quebec's Laurentian mountains. Following these experiments, which are still going on, night vision training and testing have been in practical use in the R.C.A.F. for more than a year.

In general the basic program used is much the same as that of the army with which the early experiments were carried out. Its aim is to train personnel in sound visual habits at night time. At low illumination vision is much different from that in daytime. This training would also help in the allocation of specific duties.

A 45-minute demonstration and training period is given the men in small groups of about 12 during which their eyes become "dark adapted." Training is carried out by means of lighted panoramic silhouettes on a screen with some animation such as moving motor cars or aircraft. Then more elaborate devices grafted on specialized situations

appear—actual three-dimensional towns built on a scale to appear 2,000 feet below a flying level—actual reconnaissance photos—artificial moons which show how whole areas of landscape disappear or change appearance as the direction of the moonlight changes—everything which may explain distortion of the bomber's vision and help his aerial interpretation is portrayed on this Lilliputian stage. As the eyes become dark adapted many interesting facts are learned. The night vision comes in a waxing and waning effect; a stationary object may appear to be moving; imaginary points of light seem to flash like tiny airplanes.

Once night vision has been obtained there are several methods of maintaining it. If sudden exposure to light becomes necessary one eye can be kept closed to preserve its use in the subsequent darkness. Red light does not diminish the ability to see in the dark as does white light. Hence red goggles can be used. Trainees are taught to look to one side of an object, not at it, so that the image may fall on that part of the retina which is most sensitive to dim light. Protection of night vision is also obtained by keeping the

level of white light illumination low. For this purpose "mock-up" cockpits have been built for night vision training in which correct use of cockpit lighting in instrument and map reading is taught. The correct use of special night binoculars is also demonstrated. By these, many objects can be seen which are invisible to ordinary sight.

Every member of air crew is given night vision training early in his course. Trained members of the Women's Division under medical supervision have largely taken over this work at this stage.

A further training is instituted later and extends over a four-weeks period. Recognition of more complex forms such as aircraft identification, target spotting, etc., is carried out. For two hours once or twice a week airmen are trained to use their eyes more efficiently and learn where to look for these more involved objects.

Immunization Program

When adequate selection standards have been achieved then maintenance of these standards is necessary. Two of the most important methods of maintaining this high level are through

preventive medicine and adequate nutrition.

In the thorough medical examination which all would-be members of the R.C.A.F. receive prior to enlistment, special emphasis is placed on the detection of any communicable disease. Upon enlistment they are sent to a manning depot for basic training. However, there may be a time lag of a few days to several weeks between the initial examination and the time they reach manning pool. During this time the recruit may acquire some communicable disease at home and before he can be immediately rechecked he may arrive at the new depot with a suitcase in one hand and a case of scarlet fever in the other.

Large numbers of men with varying degrees of immunity are gathered together from all parts of Canada and are required to live in close contact with each other. They are examined for body parasites, infectious diseases and venereal diseases shortly after they arrive, but as they arrive singly or in small groups at all hours of the day and night, several hours may elapse before medical examiners have a chance to weed out those

with obvious infection. Hence in case any infection is passed on before detection new recruits are segregated in a so-called quarantine wing for a period of 10 days. This is a working quarantine arrangement which allows the medical staff time to observe the recruits for the developments of any communicable disease and also gives them time to start the immunization program.

All R.C.A.F. personnel are given the Dick and Schick tests for scarlet fever and diphtheria susceptibility. Those showing positive reactions receive immunization inoculation. The diphtheria inoculations have been outstandingly successful. They are also immunized against smallpox, typhoid and tetanus. Personnel who are posted overseas to theatres where cholera, typhus or yellow fever are prevalent receive inoculations for these diseases. In western Canada at two bombing and gunnery schools the members are vaccinated against Rocky Mountain spotted fever.

In general four methods of controlling infectious diseases are practiced in the air force. The first is quarantine or segregation of new trainees for 10 days; the second is the specific

immunization program; the third is local control of spread by regular medical inspection of all contacts for early recognition and isolation; and the fourth is close inspection of all troop movements.

Nutritional Studies

The highly successful nutrition program now being carried out by the air force has been the culmination of research, experiment and constant revision since the war began. In 1939 the ration used was the same as had been in effect since the last war—a diet adequate for filling a vacancy—but woefully lacking in nutritional value. Especially was this true in the case of air force personnel who do not expend a tremendous number of calories in actual physical movement but who must at all times have optimum health.

Accordingly in November, 1939, a special committee was formed within the National Research Council to study the problem and in January of 1940 the new ration went into effect. However, there were still many evidences—such as low ascorbic acid (vitamin C) blood content—that the standard of health of airmen and airwomen was not

as high as it should be. No opportunities for assaying the food in its cooked state had been made so studies were undertaken to determine the food value of the ration as it was served after it had passed through large quantity cooking. It was found that tremendous losses in nutrients were occurring during the cooking processes. For instance, 146 milligrams of ascorbic acid were contained in the average amount of raw food supplied each day. The recommended daily requirement is 75 milligrams and thus there appeared to be a wide margin of safety. From assays of the food served it was found that on an average only 23 milligrams of vital ascorbic acid were being retained after the food was prepared.

As a result of such findings trained dietitians were brought into the service to introduce more scientific knowledge into the planning and preparation of the food. These dietitians were women, commissioned into the Women's Division of the service and put in complete charge of R.C.A.F. messes. Today there are more than 100 and the results have been exceedingly gratifying. They are in charge at every

"Fermentometer"
—apparatus
used in
R.C.A.F.
nutritional
laboratories
for
assaying
vitamin B₁
content
of
food
served to
air force.



station where there are 700 to 800 men and bear sole responsibility for directing kitchens, mess halls and the discipline of the staffs concerned. Subsequent tests have shown greatly increased nutrient value in the food cooked and messing standards have improved by the more attractive and palatable presentation.

Many improvements in the dietary standards were introduced. Fruit juices, particularly citrous and apple fortified with vitamin C, were placed on the table as being one form which

cooking could not spoil. More vegetables, fresh when available, were served and heavy high calorie foods cut down. Twenty ounces instead of the previous 10 of milk were supplied and one-quarter of it served in the form of irradiated evaporated milk to increase the vitamin D supply. Rationing orders, general to all of Canada, had some effect on this improved ration, but otherwise it has been little changed since its adoption in June, 1942.

Although the new diet looked satisfactory, a further survey to

determine nutritional adequacy and palatability of this new ration revealed certain disturbing factors. Of 10,000 service personnel examined almost one-third were constantly refusing the provided fruit juices. The basis of this refusal was not so much a distaste for fruit juices as much as a failure to recognize their nutritional importance. Some form of educational campaign was needed.

It was not enough to have lectures for the dietitians and medical officers. Although this was done and in some measure helped, the men themselves had to be reached. Hence a colored motion and sound picture was prepared and shown to the airmen at each station to which

they were posted in the course of various training moves. Most saw it, perforce, three or four times. The picture, "Training Table," was attractively done and by comparing the functions of the human body to the mechanical processes of an aircraft, endeavored to explain the importance of correct diet. Being, in most cases, more familiar with the workings of a plane than with those of his own stomach, the airman reacted favorably and a big improvement in eating habits came about. In the film he could see that by eating foods rich in minerals his own "undercarriage" or bony structure was being strengthened; that fats and carbohydrates fuelled his motor and gave



Small room
in one of four
R.C.A.F.
nutritional
laboratories
where cooked
food is
tested for
nutritional
value.

him the pep to take off on a day's operations; that meat and cheese and eggs gave him the proteins necessary to repair his worn-out body tissues in the same way that ground crew give new life to a battered aircraft—these and other comparisons drove the point home.

To further instil the idea a colored booklet based on the film was produced by the Canadian Medical Association and the life insurance companies of Canada and given to every member of the service. As a result of these measures the fruit and milk complement have become very popular and there is a constant demand for still more.

Once the educational program was under way, the next big step in this huge food program which aimed at keeping more than 200,000 persons fit and healthy, was that of translating the theory of nutrition into actual terms of the food served in the R.C.A.F. Early in 1943 four nutritional laboratories were set up to test the cooking of vitamins; to assay the food as actually served; and to keep informed the messing officer and medical officer of each unit of the degree of success achieved. The

laboratories were not built in R.C.A.F. stations but were placed in universities where the interest and aid of trained biochemists and students in nutrition were available in a consulting capacity. They were entirely staffed by a commissioned officer trained in biochemistry and by assistants, both airmen and airwomen who had had previous training in this field.

At one nutritional laboratory a test kitchen has been established. Here new recipes for quantity cooking are developed from materials supplied by the ration. They are based on maximum palatability and maximum retention of food value. These recipes become the official recipes of the R.C.A.F.

The machinery for assaying the food as cooked and prepared in various stations operates as follows: Each week the food of a complete five-day period is collected from two R.C.A.F. stations by the nearest laboratory. It is tested for nutrient content and the results of the tests are examined at a weekly conference of messing and medical personnel at Ottawa headquarters. Through the messing service the results of the tests and any suggestions for overcoming deficien-

cies go back to the officer directly responsible for messing at the station concerned.

In this way a complete round-up of nutritional adequacy is provided and every step possible taken to perfect R.C.A.F. diet.

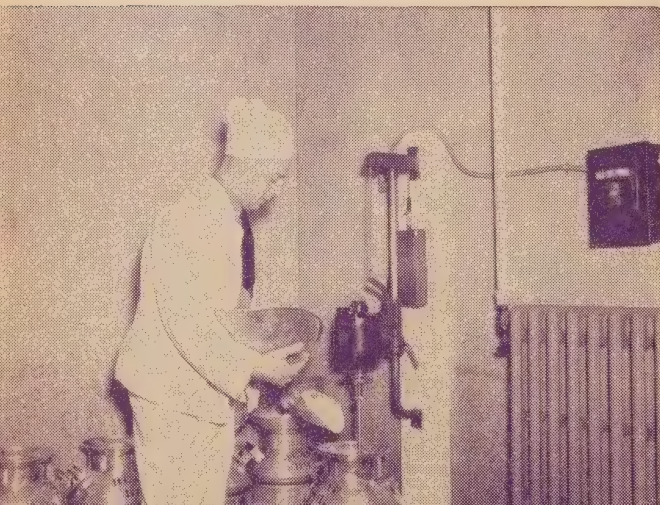
Fresh Milk

It is one thing to determine the amount of milk required in an airman's diet and to educate him to take it but it is often another problem to supply it. This is particularly true of such isolated stations as that at Goose Bay, Labrador. Powdered milk is the only form available, and while it is nutritionally sound yet to many it is very unpalatable. Hence considerable research was carried out in co-operation with dairy experts until it was found that whole

powdered milk can be reprocessed until it is indistinguishable from fresh milk. The process involves mixing, straining and aging for a 24-hour period. On 15 of the larger isolated stations trained dairymen came in to set up and operate special apparatus for this purpose. In many smaller stations such as those in the far northwest, small mixing apparatuses are used in the kitchen to improve the milk for drinking.

Heated Food Boxes

Another problem of supply that has been successfully overcome is that of somehow serving hot food to the patrol fliers who day after day and often year after year have been guarding Canada's long coast lines. Out in their Cansos and Liberators these lads fly lengthy 12 to 18



On 15 larger isolated R.C.A.F. stations milk powder and water are mixed by electrical agitators to improve taste.

On long coastal patrols electrically heated food boxes containing four cannisters and 12 thermos bottles provide hot meals in freezing altitudes.



hour stretches every second day, scanning the waters and skies for enemy danger. In summer their food problem is not too bad but cold coffee and frozen sandwiches were their winter lot until recently. Now, a large insulated food box has been devised which contains four large metal cannisters for hot food

and 12 thermos bottles. The box has its own coil and is electrically heated at the station before the fliers leave. Food can be kept at 150 degrees for 12 hours at a 10 degree below zero temperature in the plane. If it cools off it can be reheated by plugging into the electric current on the plane.

Protective Clothing

After the best available air crew has been obtained by selection and constant medical maintenance, it is up to the air force to see that they have the best equipment to work with. The air crew of each craft are a team—the failure of one man may mean the failure of the whole mission. In many instances the failures are due to inadequate protective clothing. Hence comprehensive research has been carried on to supply each airman with the best that science and money can provide.

In the air force there are three main branches of personnel; air crew, ground crew, marine crew. Specific requirements of clothing for the marine crew are essentially the same as for the navy; those for ground crew the same as the army; while those for the air crew in flight are peculiar to that trade and are governed by aircraft design, duties to be performed and environmental conditions of temperature, pressure, etc. The airman must be made efficient in an abnormal environment; hence this work is based on his functional requirements—the what, where and how of flying.

As the altitude increases and the pressure correspondingly

lowers, a diminishing oxygen supply must be augmented in a manner which will not interfere with its function of distribution. At 12,000 to 15,000 feet a pure oxygen supply is not needed, but at 25,000 and up 100% is vital. Oxygen masks had to be produced with valves for controlling inhalant and exhalant pressures and with regulators to provide a safe flow per minute. All this equipment had to be capable of producing what the man needs under all conditions of work and excitement. For instance, the pilot in his sedentary role does not need as much as the gunner who is loading ammunition. The amount of oxygen can't be predetermined, hence equipment was evolved which works on a "demand" system regulated by the man's own breathing.

The question of moisture condensation in the cold of higher altitudes also had to be overcome or the control valves froze. To this end the oxygen used is carefully dried and valves are installed in the masks which prevent humid exhaled air from going back into the intake.

Within this mask, which has to be leakproof, comfortable, light and flame resistant, is

built an intercommunication system. Communication operates three ways: Among members within the same aircraft, to other aircraft, and from aircraft to ground stations. The microphone had to go in the mask. Further it had to be small, light, effective and be able to eliminate as much resonance and plane noise level as possible. Also the difficulty of distinguishing certain sounds and the intelligibility

of certain words in this environmental noise background had to be taken into consideration.

The earphones too are in the mask for, if the noise level is outside, they won't work. Through a great deal of investigation it was found that certain materials exclude sounds better than others and that mass is an important factor in noise insulation. Thus a receptacle unit was developed by using lead

Protective clothing and many purpose helmet results of intensive research.



impregnated in rubber and fitting around the bony mastoid section of the ear. This had to be efficient, comfortable yet tight, and adequately hold the ear-phones.

To incorporate all these uses a helmet was provided which in itself served several functions. It gives warmth, protection from flash burns, noise protection, lightness in the dome for sea landings, as well as being a receiver on which to tack the oxygen masks and goggles. To this difficult end six major sizes of helmets are now in stock designed from numerous measurements and made from plaster and wood models.

In the research for protective clothing for the rest of the body the problems were equally complicated. Navigators and gunners must have free use of their hands so gloves come in three units. There is an outer leather glove with the fingers bent to fit the natural shape of the hand; a second glove of wool for warmth; and a third specially-treated inner rayon glove. The woollen and leather ones can be pulled off together leaving the rayon one to give sufficient short-period protection against cold

to enable the airman to fix his guns or examine instruments.

The legs of the flying suit are curved to fit the knee. The suit must be loose enough to maintain maximum thermal insulation yet have functional thickness of double pile wool. To keep thickness uniform over a period of wearing, pressure on different parts of the body had to be studied as seats, parachute straps, etc., create vulnerable spots. Clothing must have good resistance to compression, be wind-resistant but not impermeable. It must resist degradation by perspiration, snagging, tearing and abrasion. In all, there are 29 points upon which materials used are tested.

Other Work

These are but a few of the many problems which Canadian medical and research workers have met and overcome in aviation medicine. There are many other studies—decompression sickness; blackout; air evacuation of the sick and wounded; airsickness; psychological problems met in flying; emergency landing equipment; venereal disease control—in fact everything which science can do to keep Canada's air force fit.

Base Metals Aid Allies

CANADA ranks first as an exporter of base metals. During the war the exports of non-ferrous metals and minerals and their products, excepting gold, rose in value from less than \$213,000,000 in 1939 to nearly \$395,000,000 in 1943.

The last two years have ranked as Canada's greatest in mining and metallurgy.

This has resulted from the expansion of the aluminum industry to a peak more than six times greater than that of pre-war days; development of facilities for producing magnesium from dolomite; extension of operations at the large base metal mines; revival of old mines; expansion of existing mines, and exploitation of new properties, including marginal and sub-marginal deposits.



An average of about 65,000 non-ferrous mine, smelter and refinery workers, including those employed in gold production, were working in 1943, compared to an average of 58,043 in 1939. A labour shortage has existed, and production of gold has dropped drastically to provide men for armed service, base metal production, other war programs.

Definite records of the annual value of metal and mineral production began in 1886. In that year the value of all mineral products was \$10,221,255 or \$2.23 per capita. In 1939 the total value of mineral production was \$474,602,059 or \$41.94 per capita. Despite the sharp drop in gold production, the 1943 total was an estimated \$524,426,850 or \$44.40 per capita.

Canada has been able to fulfil its obligations in metals and minerals to both the United Kingdom and the United States and to provide for its own essential needs. Because ocean losses dropped during 1943 and because of the success of efforts to provide new sources of production and increased production from known sources, the supply of certain strategic metals and minerals—aluminum, nickel, chrome ore, magnesium, graphite, cobalt, mica, mercury, copper, tungsten and molybdenum—is keeping up with essential demands.

A toll has been taken of known ore reserves, but prospecting is being encouraged and marginal and sub-economic properties have been tapped.

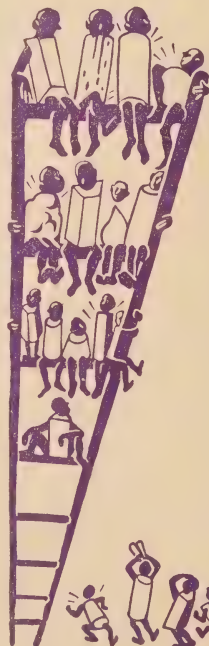
Achievements in the production of the light me-

tals, magnesium and aluminum, have been outstanding. The output of aluminum in Canada is not new, but its rapid expansion has rivalled that of any industry anywhere in the world. Canada's production is now roughly equivalent to the total world output in 1937.

Until the summer of 1942 not one pound of commercial mag-

nesium was available in Canada that had not been imported. In that year a \$3,000,000 government-owned project at Haley, Ontario, produced its first crown of magnesium, and at the end of 1943 Canada was producing more than 10 tons of magnesium a day. After supplying all its own needs it was able to export the major part of this tonnage to the allied nations.

CANADA'S PLACE IN WORLD PRODUCTION



1st in
NICKEL
ASBESTOS
PLATINUM
RADIUM

2nd in
GOLD
ALUMINUM
MERCURY
MOLYBDENUM

3rd in
COPPER
ZINC
LEAD
SILVER
ARSENIC

4th in
MAGNESIUM

Production of certain metals and minerals in Canada in 1939 and 1943 was as follows:

	1939	1943*
	(thousands of	
	pounds)	
Aluminum.....	163,900	985,350
Asbestos.....	728,000	884,000
Chrome ore.....		60,100
Copper (all forms)	605,800	589,400
Fluorspar.....	480	22,900
Lead (all forms)..	380,200	459,600
Magnesium.....		7,120
Mercury.....	440	1,690
Mica.....	2,140	2,410
Molybdenum.....		500
Nickel.....	226,100	287,600
Tin.....		780
Tungsten.....		840
Zinc.....	394,400	607,000

* Estimated. (In the copper, lead and zinc figures allowance has been made for estimated smelter losses in treating concentrates.)

When the vast expansion of Canadian industries began after the fall of France, Canada found itself in seriously short supply of many of the non-ferrous metals. To meet this situation a metals control was established to regulate the supply, distribution and use of non-ferrous metals and industrial minerals.

One achievement has been the substitution of less scarce metals for those in shortest supply. For example, silver is being used largely in solders and brazing alloys to replace tin. Manganese bronze and lower-tin bronzes are being used instead of pre-war,

high-tin bronzes for industrial castings, and a tin-free bronze has been developed and used for gear manufacture.

In 1940 the domestic use of aluminum, nickel, zinc, magnesium, tin, cadmium, copper and brass was restricted, and later these controls were tightened. Under permit requirements, exports of all non-ferrous metals, common metal alloys and industrial minerals have been carefully scrutinized, and applications for non-essential use have been refused or reduced.

In terms of the allied war effort and excluding production by Soviet Russia, Canada contributes these percentages of the combined output of the United Nations:

Nickel.....	94%
Asbestos.....	75%
Aluminum.....	32%
Zinc.....	20%
Lead.....	17%
Copper.....	10%

Because of rising war demands, the supply position of most non-ferrous metals showed no improvement until the latter half of 1943. Even essential civilian uses have been curtailed. The shortages of some of the most important non-ferrous metals are likely to continue

until the war is ended, but restrictions on the use of secondary aluminum and domestically produced magnesium have been removed.

In every instance the war needs of the United Kingdom and the United States have been given priority in the matter of

exports. The export of non-ferrous metal scrap is prohibited unless the scrap cannot be treated or is not needed for war production in Canada.

In a general way this is how five of the basic non-ferrous metals are being used in Canada:

METAL	Direct War Consumption	Indirect War Consumption	Essential Civilian Consumption
Primary aluminum..	96%	3%	1%
Refined copper.....	96%	3%	1%
Refined nickel.....	90%	8%	2%
Tin.....	60%.....	40%
Refined zinc.....	87%	6%	7%

A comparison of world production and Canadian produc-

tion of non-ferrous metals for the years 1939 and 1942 follows:

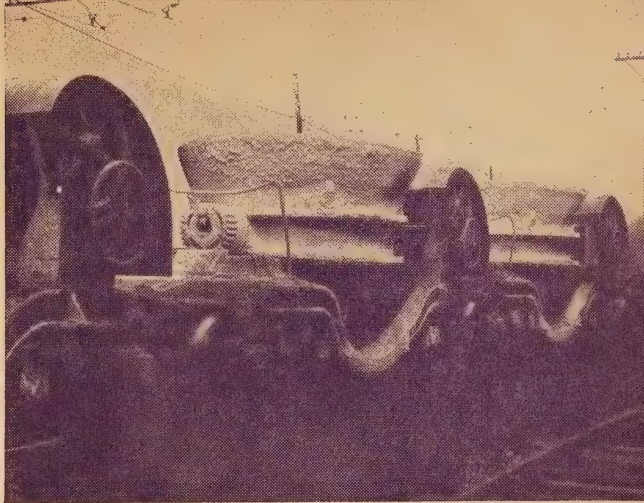
	1939			1942		
	(thousands of short tons)					
	World Pro- duction	Canadian Pro- duction	% of World	World Pro- duction (Estimated)	Canadian Pro- duction	% of World
Aluminum (refined).....	749	83	11.1	1,496	336	22.4
Copper (blister).....	2,354	254	10.8	3,045	275	9.0
Lead (all forms).....	1,899	196	10.3	1,884	251	13.3
Nickel (all forms).....	137	113	82.3	171	142	83.0
Zinc (refined)	1,850	176	9.5	2,316	216	9.3
TOTAL	6,989	822	11.8	8,912	1,220	13.7

Aluminum

In 1938, the last full year of peace, the total production of aluminum in Canada was less than 143,000,000 pounds. In 1943 it was 985,000,000 pounds. The combined exports to the United Kingdom and the United

States in 1938 were about 70,000,000 pounds. Last year, after providing for all domestic war production, more than 444,000,000 pounds were exported to the United Kingdom, and 405,000,000 pounds were sold to the United States. Sev-

Canadian nickel plays large part in making alloy steel for weapons of war—here nickel slag is carried in one stage of refining process.



eral smelters are operated in various localities, among which is the largest in the world at Arvida, Quebec.

Aluminum production in the last five years has been as follows:

	Pounds
1939.....	163,903,000
1940.....	214,958,000
1941.....	424,587,000
1942.....	671,695,000
1943.....	985,352,000

The principal requirements for the making of aluminum in Canada are bauxite from the tropics of South America, cryolite from Greenland, acid-grade fluorspar from Newfoundland and the United States, and electric power from the rivers of Quebec. At present about one-quarter of all the power con-

sumed in Canada is used in this one industry, and the industry itself has been responsible for the development of much of the power it consumes.

Nickel

Nickel production during 1943 was 25% greater than at the beginning of the war. Canada is providing 94% of the nickel available to the Allies.

Production of nickel in Canada during the past five years has been as follows:

1939.....	113,000 tons
1940.....	122,800 "
1941.....	141,100 "
1942.....	142,800 "
1943.....	143,800 "

Nickel does a big wartime job. Its greatest users are the steel manufacturers who consume

70 to 75% of the total Canadian production in the production of alloy steel. Nickel alloyed steel has a toughness, strength, and impact resistance which is essential for tank armor plate, for armored vehicles, warships, and armor-piercing shells. Mechanized equipment also needs special steel in certain vital parts which require great strength such as axles.

Nickel is used, too, in various non-ferrous alloys where they are needed for their heat-resisting and non-corrosive qualities as well as their combined strength and magnetic properties. A small percentage is also utilized in nickel plating.

All nickel production is under strict allocation, but small quantities are being released for essential industrial purposes. Nickel for electroplating purposes was reduced to 50% of the 1940 and 1941 consumption. Its use for war and essential civilian purposes has left only a small amount for other uses. In 1940 the direct and indirect war use was 60%, in 1941 it was 85%, and in 1943 it was 98%. The greatest civilian saving was effected by the stopping of passenger car and civilian truck manufacture. Next in impor-

tance was the saving made possible by revisions in nickel alloy specifications.

Asbestos

Canada is the world's largest producer of asbestos, yet the domestic consumption is less than 5% of the total output. About 75% of the United Nations' requirements is being supplied by this country with the balance chiefly from South Africa. The major part of the exports goes to the United States but substantial quantities are shipped to the United Kingdom. By strict conservation and rigid control over exports to neutral countries more than 80% of the production is being used for direct war purposes.

Asbestos is an essential in making clothing for fire-fighting, for covering steam pipes and for the countless industrial processes which involve heat and the danger of fire. As an industrial component it is important in the manufacture of brake linings for automotive equipment.

Magnesium

Potential millions of tons of magnesium are locked in brucitic limestone and dolomite ores in Canada, but the problem that

faced metallurgists was not the extraction of magnesium oxide from these plentiful ores, which would have been easy, but the removal of the oxygen from the oxide quickly and cheaply without causing an explosion. This problem had been tackled in the laboratories of the National Research Council in 1937, however, and by November, 1940, a laboratory answer had been found. Within another year the process had been proved commercially so that a domestic industry could be established. By mid-December, 1942, the daily output was approaching its peak.

In the production of magnesium, ferro-silicon is used as a reducing agent. It is estimated that from one ton of ferro-silicon and 10 tons of dolomite, one ton of magnesium ingots can be produced.

Magnesium is a metal so weak in its pure state that a small boy could bend a half-inch bar, yet so tough as an alloy that it will stand the shock of landing a 30-ton warplane. It is so effective as an incendiary ingredient that it will burn up many a German city, yet so inert as a solid that a 3,500-degree blow torch could be applied to it and it would not burn.

To the chemist it is a metallic element which, in its natural state as an oxide associated with other elements, is almost as common as iron, and in its artificially pure state was, until a short time ago, rarer than silver.

So far as North America is concerned, Canada has pioneered in its production. First commercial output on this continent was from United States raw materials processed from 1915 to 1919 at Shawinigan Falls, Quebec. First production from Canadian materials, and first use of the new, more rapid and safer process, was at the new plant at Haley, Ontario. Chosen not because it was the only source of dolomite, but because the outcropping was close to available power, the site was near transcontinental railway lines and not too far from other war industries. Already the United States government has utilized the same process or other ferro-silicon methods in plants costing about \$50,000,000.

When war broke out the production of magnesium on this continent was insignificant. By the end of 1943, the United States and Canadian production



Molten slag from huge lead furnaces cascades from one giant pot to another.

total far exceed that of the Axis and was sufficient to meet all essential war requirements. Until the output from Haley began to flow, the North American supply was coming from the treatment of sea water or subterranean brine in the United States.

The chief use of magnesium is in aircraft alloys, metals tough enough to stand terrific flying strains and stresses, yet light

enough to add hundreds of miles to the effective range of a bomber or fighter. As important to the airman is the use of magnesium as an ingredient of parachute flares so brilliant that they will light up a large target area thousands of feet below the aircraft. In addition, magnesium is used in night bombs, in certain shells and in other pyrotechnics. Magnesium castings for industrial purposes are being put to increased use.

Facts and Figures

ARMED FORCES STRENGTH—765,900

(more than)

	Pre-war	Present
Navy.....	1,700	84,900 (80,000 men, 4,900 women)
Army.....	4,500	478,000 (465,000 men, 13,000 women)
Air Force.....	4,000	203,000 (189,000 men, 14,000 women)
Total.....	10,200	765,900 (734,000 men, 31,900 women)



CASUALTIES—46,394

ARMY

**For Normandy theatre to July 20,
1944**

**For all theatres except Normandy
to June 30, 1944**

Fatalities.....	7,965
Presumed dead.....	222
Missing.....	1,726
Prisoners of war or interned*..	3,731
Wounded.....	15,827
TOTAL.....	29,471

AIR FORCE TO JUNE 30, 1944

Fatalities.....	4,744
Missing.....	3,250
Presumed dead.....	4,731
Prisoners of war.....	1,608
Interned.....	18
Seriously wounded or injured..	858

TOTAL..... 15,209

NAVY TO JUNE 26, 1944

Killed on active service.....	987
Other deaths.....	172

TOTAL DEATHS..... 1,159

Wounded or injured.....	212
Prisoners of war.....	8
Missing.....	335

TOTAL CASUALTIES..... 1,714

* The figure for prisoners of war includes 101 who have been repatriated or have escaped.

ESTIMATED INTAKE INTO THE ARMED FORCES*

Officers and Other Ranks and Ratings

[W.R.C.N.S., C.W.A.C. and R.C.A.F. (W.D.) not included]

To March 31, 1944

ARMY

Place of Permanent Residence at Time of Enlistment (See note F)	Male Population, Ages 18 to 45 (See note A)	Appointments and Enlistments (See notes B and E)		Enrolments, National Resources Mobilization Act (See notes C and E)		Less Inter- service Transfers and N.R.M.A. Men Enlisted (See note D)		Army Net Total (See note E)	Royal Canadian Air Force	Total Three Services (See note E)	Percentage Total Intake to Male Population Ages 18 to 45
		Royal Canadian Navy	Total	Total	Total	Total	Total	Total	Total	Total	
Prince Edward Is.	19,000	1,304	4,011	875	4,886	435	4,451	4,451	1,542	7,297	38.4%
Nova Scotia.....	123,000	6,441	39,338	5,826	45,164	2,989	42,175	42,175	7,512	56,128	45.6
New Brunswick...	94,000	2,391	28,170	6,554	34,724	2,527	32,197	32,197	6,380	40,968	43.6
Quebec.....	699,000	11,049	80,624	46,443	127,067	6,786	120,281	120,281	23,173	154,503	22.1
Ontario.....	830,000	35,467	209,639	41,502	251,141	17,295	233,846	233,846	89,693	359,006	43.3
Manitoba.....	159,000	6,783	36,658	8,665	45,323	2,866	42,457	42,457	19,928	69,168	43.5
Saskatchewan....	191,000	5,568	38,966	11,407	50,373	3,332	47,041	47,041	21,687	74,296	38.9
Alberta.....	178,000	6,500	39,339	9,330	48,669	3,215	45,454	45,454	19,381	71,335	40.1
British Columbia..	181,000	10,611	43,239	10,176	53,415	3,858	49,557	49,557	20,223	80,391	44.4
	2,474,000	86,114	519,984	140,778	660,762	43,303	617,459	617,459	209,519	913,092	36.9%
Outside Canada....		554	5,304	10	5,314	24	5,290	5,290	9,382	15,226	
		86,668	525,288	140,788	666,076	43,327	622,749	622,749	218,901	928,318	

* Figures of intake do not represent actual strength of the armed services, as they do not take into consideration men discharged for medical or other reasons, personnel pensioned, casualties incurred and other factors.

NOTES:

- A. Population figures for the age group 18 to 45 (as at June 2, 1941) were estimated from summaries of the 1941 census which had been published in five-year and 10-year age groups.
- B. Army appointments and enlistments do not include Reserve Army personnel called out on active service, from time to time, under various general orders.
- C. The above figures of enrolments, National Resources Mobilization Act, include only those men actually documented as N.R.M.A. recruits. Men who reported to training centres or depots on being called up, but who volunteered immediately and were never documented as N.R.M.A. recruits, are included with appointments and enlistments.
- D. This column consists of men discharged from the army for the purpose of joining the navy (1,410) or air force (9,818) and men enrolled under N.R.M.A. who subsequently volunteered for general service (32,099). No similar deduction has been made from navy or air force enlistments for personnel discharged therefrom to join other services, as the numbers are small.
- E. In the tabulation of intake to December 31, 1943 (published in the May, 1944, issue of CANADA AT WAR) "Army Appointments and Enlistments" were overstated by 5,379, "Army Enrolments" by 2,405, and "Army Net Total" and "Total Three Services" by 7,784 in each case. Corrections of these errors have been incorporated in the above figures.
- F. Figures of intake, previously submitted by military district, were by place of appointment or enlistment in the case of the army and air force, and by place of permanent residence in the case of the navy. Above figures by province or from outside Canada are according to place of permanent residence immediately prior to appointment or enlistment for all three services.

CANADIAN FORCES IN ACTION



THROUGHOUT the tense month of July Canadians, fighting with the British in the Caen area of Normandy, have been slogging their way through some of the heaviest and fiercest resistance of the war. Battle-scarred and hardened, they are now old-timers in combatting enemy guns, mortar fire, mud, mines, in hedge-to-hedge advancing and all the other rigors of modern ground fighting.

First real action of the month for the Canadians in Normandy came with the drive on Carpiquet, a prelude to the push into Caen. There they faced the greatest mass of German troops so far concentrated on a narrow front—troops which included the cream of Nazi strength, a fanatic Hitler Youth formation.

Units of the Canadian Third Division taking part in the advance on Carpiquet were:

North Shore New Brunswick
Regiment, New Brunswick.
Queen's Own Rifles, Ontario.
Le Regiment de la Chaudière,
Quebec.
Royal Winnipeg Rifles, Manitoba.
Fort Garry Horse (Tanks), Mani-
toba.

The village was to be taken by the Quebec and Maritime units; the hangars at the south end of the airfield by the western Canadians; and the administrative buildings by the Ontario infantrymen. Fierce tank battles prepared the way for the infantry. Wading through breast-high wheatfields in the face of 190,000 shells poured into them by Nazi guns, but with magnificent support from allied war-

ships pounding enemy positions from the sea, and air support from allied planes, the important village and finally the airfield were taken.

Carpiquet was but a spring-board for the more strategic objective—Caen—one of the key points of German defence since the start of the campaign. Through Caen pass the main communication lines from the Cherbourg peninsula to Paris and other major French cities. A town rich in invasion history, Caen was taken by two English kings during the Hundred Years' War—by Edward III who landed farther along the peninsula and took it in 1346, and by Henry V who landed 60,000 men at the Seine mouth before the battle of Agincourt in 1415 and took Caen two years later.

In joint action with the British, Canadian forces entered the city from the west while the British advanced from the north. Faced by seven of Rommel's tank divisions, the Canadians fought for two days without rest, advancing a distance of eight miles to reach the heart of the city and taking all objectives on schedule.

Participating in the capture of Caen were the following Canadian units:

Stormont, Dundas and Glengarry
Highlanders, Ontario.
North Nova Scotia Highlanders,
Nova Scotia.
Highland Light Infantry, Ontario.
Sherbrooke Fusilier Regiment
(Tanks), Quebec.
17th Duke of York's Royal Canadian
Hussars (Armored Cars),
Quebec.

Later in the month it was announced that four units of the Canadian Second Division which had fought at Dieppe had also taken part in the fighting around Caen:

Queen's Own Cameron High-
landers, Manitoba.
Essex Scottish Regiment, On-
tario.
South Saskatchewan Regiment,
Saskatchewan.
Les Fusiliers Mont-Royal, Que-
bec.

Advancing into liberated French towns with the army are Canadian civil affairs staff, specially trained to handle problems of reconstruction and administration. Their job, particularly in Caen, has been easier, because of French co-operation, than might have been expected. Much of the administration of recaptured areas is already being handled by the French.

Ten days after the capture of Caen, while United States forces were bursting victoriously into the stubbornly-resisting town of St. Lo, British and Canadian troops staged a new breakthrough southeast of Caen and pushed to the Orne River. The drive was supported by an unprecedented air offensive in which 20,000 tons of bombs were dropped over Normandy during 36 hours. Every R.C.A.F. squadron was represented.

Speaking of the decisive push past Caen on July 19, General Sir Bernard L. Montgomery, commander-in-chief of the Allied Army Group under General Eisenhower, praised the infantrymen who, in their unspectacular role, bear

"the heat and burden of battle in a way no other army does, but are the guts of the whole thing and do their stuff all day and all night."

Of the whole operation he said:

"It was a most inspiring sight for the soldiers on the ground to see the might of the allied expeditionary air force. When properly applied, air power is decisive. Yesterday's operation showed just how air power should be used."

General Montgomery also praised the Sixth Airborne Division which contains a Canadian parachute battalion. It had won and held a bridgehead east of the Orne to the northeast of Caen

since D-day and was finally joined by armor and infantry in the breakthrough.

The first assault was bogged down by torrential rains for several days. When reopened, it had become a test of brute strength. Reinforced by fresh divisions, the Germans held their solid lines and succeeded in gaining the initiative several times. The British and Canadians held their main positions five or six miles past Caen and managed to register small gains in some sectors.

Reports from the front said that in the second week of fighting past Caen the battle had settled down into a gruelling artillery and infantry duel, reminiscent of World War I. While the British and Canadian forces held this tremendous enemy concentration, United States forces were able to smash the Nazi lines from St. Lo to Coutances and sweep ahead in an offensive designed to shatter German strength in the peninsula. In the last two days of the month the British and Canadians reopened with a slogging offensive on the right wing around Caumont. In one sector a five-mile dent was made in German lines during the first day.

Much of modern battle technique is as old as battle itself, with certain modifications brought about by mechanical inventions; but with each phase of the present war some new tactic is also introduced. Of particular assistance to the infantry in the advance on Carpiquet and Caen has been the close support given by rocket-firing Typhoons. These versatile fighter planes carry eight rockets as well as four cannon. They have been used to provide close support to ground troops, usually against such objectives as enemy armor, transport buildings and firmly held armored positions.

A new gunnery technique was used first in the invasion and later at Caen—mounting land artillery on landing craft. Navy and artillery personnel work together. The navy's job is to keep the ships aimed and give the orders to fire; the gunners man the guns and do the rest. The resulting firepower is estimated as equal to that of a modern heavy destroyer. In the invasion this tactic was used to cover landing forces before it was practicable to set up artillery posts. It is also used as a means of adding to the firing power of ships off the coast, dispersing

guns and gun crews among the assault craft and making maximum use of both men and equipment before they can be landed.

Establishment and maintenance of speedy supply lines are one of the most difficult tasks of any army. In Normandy transports and supplies are routed from the beaches to the front with the efficiency of a modern traffic system. One-way roads are used and military police are at every crossroads. Where double-lane traffic is necessary engineers have widened roads in some cases to almost twice their normal size.

To give its men some idea of the tremendous beachhead organization and life behind the front, one Canadian battalion ran a series of sightseeing tours before the assault on Caen. Two trips a day of about 30 men each brought forces from the front to rear areas.

Medical Services. — During the first month of the invasion, Canadian and British casualties were treated together, going through a common clearing station. Early in July a Canadian clearing station was working and Canadian nurses and doctors were in action in British hospitals. On July 25 the first



Canadians at Caen limits stand on Paris route.



R.C.N. commandos survey Nazi west wall ruins.



WAR DIARY

July 1. Nazis strongly counter-attack on Odon front in Normandy. United States forces cleaning up Cherbourg.

July 2. R.C.A.F. Spitfire wing bags 19 of 21 German aircraft shot down over Normandy. One flier downs three Me109's in one minute. United States landings on Noemfoor Island off New Guinea.

July 3. United States forces launch offensive in Carentan-Carteret Sector. Minsk captured by Russians. Siena taken by Fifth Army.

July 4. Canadians battle for Carpiquet airfield and take village. Polotsk taken. Fall of Garapan, capital of Saipan. Bonin Islands raided by United States forces.

July 5. Canadian coastal forces break up German E and R-boat pack near Orne mouth. Canadian Spitfire wing downs seven aircraft, raising its total to 65 in one week. Wing Commander J. E. (Johnny) Johnson, leading allied fighter ace, and head of an R.C.A.F. Spitfire squadron, downs 35th enemy plane. Shuttle planes complete first round trip of 7,000 miles: England to Russia to Italy to England.

July 6. Announced that H.M.C.S. *Swansea* sinks U boat. Canadians in advance on Arezzo in Italy. Kowel taken by Russians. Churchill announces 2,754 robot bombs launched, killing 2,752 and wounding 8,000.

July 7. Second Superfortress raid on Japan by United States.

July 8. New offensive launched around Caen by British and Canadians.

July 9. Caen captured. United States takes La Haye du Puits. Red Army bypasses Vilna near Lithuanian border. Capture of Saipan completed.

"Alouette" squadron loads 500-lb. bombs under Halifax.

FOR JULY

July 10. Russians cross border into Lithuania. Guam bombed continuously for past six days.

July 11. General Charles de Gaulle in Ottawa. General Montgomery announces more than 54,000 prisoners taken in Normandy. Announced that allied air loss from June 6 to July 6 less than 1% of planes participating.

July 12. Two Chinese divisions join seven miles west of Mogaung, clear Kamaing-Mogaung road to give allies control of 300 miles of new Ledo route to China.

July 13. Major J. K. Mahony of New Westminster, B.C., wins Victoria Cross. Canadian Spitfire squadron downs 10 of a group of 12 FW190's. German convoy attacked near St. Malo by Canadian MTB flotilla. Two merchantmen sunk, one escort vessel in flames, others damaged. Vilna falls to Russia.

July 14. Pinsk captured. In London "buzz-bomb" evacuations exceed those of blitz. Hengyang in China again encircled by Japanese. British and Greek shock troops take Simi, German Aegean base.

July 15. Announced that R.C.A.M.C. nursing sisters in France. New allied offensive around Caen. E-boat set afire and others damaged in Seine Bay by Canadian ships.

July 16. H.M.C.S. *Haida* assists in sinking two German ships, probably a third. British take Esquay. Red Army seizes Grodno, gateway to East Prussia. Fall of Arezzo announced. British, Yugoslav partisan and United States commandos hit Dalmatian Islands. United States warships bombard Guam. Japanese losses around Hengyang said 14,000 between June 23 and July 14.

Rocket-bearing Typhoon extends arm of artillery.



Landing ships disgorge supplies into Normandy.



Medical corps evacuate casualties under fire.



WAR DIARY



H.M.C.S. *Prince David* takes U.S. troops to France.



Three miles below is robot base hit by R.C.A.F.



July 17. Eighth Army crosses Arno River. United States forces in St. Lo suburbs.

July 18. British and Canadians break through enemy lines southeast of Caen. Fall of St. Lo. Greatest air offensive of war with every Canadian squadron represented. Japanese cabinet shake-up with Tojo relieved of duties as chief of army general staff.

July 19. British and Canadians in worst fighting of war advance seven miles past Caen. General Montgomery says Germans lose 156,000 in Normandy. Fall of Leghorn and Ancona. Russians cross Bug River and open offensive against Latvia. Entire Japanese cabinet resigns.

July 20. Attempt on Hitler's life. Canadians down eight of 10 aircraft destroyed over Normandy. 90% of Japanese garrison killed at Saipan, 19,793 Japanese buried up to July 17. Landings made on Guam. Attack on Bonin Islands from Saipan-based planes.

July 21. Revolt of certain German generals smoulders. Russians cross Bug River on 37-mile front. Fall of Ostrov.

July 22. Allied troops make gains around Myitkyina, Burma. British and Canadians make small advances in Normandy.

July 23. King George lands in Naples. Pisa entered by Fifth Army. Pskov captured by Russians. United States invades Tinian in Marianas Islands.

July 24. Fall of Lublin, Poland. Three Canadian pilots destroy seven enemy planes while returning from weather patrol. More than 539,000 Nazis killed or captured by Russians since June 23. All Japanese cleared from Imphal plain.

Major J. K. Mahoney wins V.C. for heroism in Italy.

FOR JULY

July 25. Four units of Canadian Second Division announced in fighting at Caen. First Canadian general hospital opened in France. British and Canadians on attack southeast of Caen. Nazi "big four" gain control of Reich. Announced that R.C.N. base to be established at Bermuda.

July 26. United States forces break through German lines near St. Lo. Russians reach Vistula River on 30-mile front. Fall of Narva in Estonia. H.M.C.S. *Camrose* credited with probable kill of German submarine.

July 27. Russians take Lvov, Bialystok, Stanislovov in Poland and cross Vistula. United States takes Lessay and Periers. One R.C.A.F. squadron downs eight planes. Allied warships supported by carrier-based planes bombard Sabang, Sumatra.

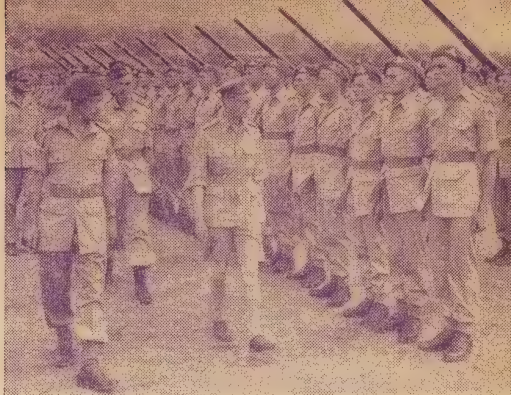
July 28. Victoria Cross awarded posthumously to Flight Lieutenant David E. Hornell, Mimico, Ontario. United States forces smash into Coutances. 14 Canadian squadrons, over 1,000 fliers, in raid on Hamburg. 23 Canadian planes lost. Brest-Litovsk falls. Red Army only few miles from Czechoslovak border.

July 29. Superfortress raid on industrial centre of Mukden, Manchuria. Eighth Army seven miles from Florence.

July 30. New British offensive on right flank around Caumont. Advance five miles in one sector. Red Army enters Suwalki near East Prussia.

July 31. British score eight-mile advance on seven-mile front south-west of Caumont. United States forces in Avanches. Russians attack suburbs of Warsaw and enter Kaunas, second city of Lithuania.

Canadian pilot and tank officer view Norman havoc.



King George inspects R.C.A. on Italian front.



Fl. Lt. D. E. Hornell—first V.C. winner in R.C.A.F.



Canadian general hospital in France was opened, manned by Canadian medical staff. A few hours after it opened, casualties from the Caen region arrived and were undergoing treatment.

Supreme Headquarters Allied Expeditionary Forces has announced the Canadian losses in Normandy from June 6 to July 20 as 6,545—919 dead, 4,354 wounded, 1,272 missing. Total allied losses were given as 115,665.

In Italy.—In Italy some Canadian units with the Eighth Army have been brought back into the fighting after the rest granted the Canadians after their thrust through the Liri Valley defences below Rome. Canadian tank units were in the advance on Arezzo in central Italy and Canadian forces are fighting alongside British troops in the drive to Florence.

Royal Canadian Navy.—During the second invasion month the Royal Canadian Navy has been following up its earlier exploits, assisting in further landing operations, off-shore shelling, convoy duty, submarine hunting, E and R-boat chasing.

The Canadian destroyer, H.M.C.S. *Haida* was again in

the news when, with two other destroyers, it encountered a small force of German ships off the French coast. Two enemy ships were sunk and a third left sinking.

The fifth U-boat to be sunk in recent months by the Canadian navy was finished off by the frigate, H.M.C.S. *Swansea*, early in July. A probable kill was credited equally to the corvette, H.M.C.S. *Camrose*, and a British warship which attacked a submarine while on Atlantic duty.

The two R.C.N. motor torpedo boat flotillas have both been active around the coast of France. One pack of German E and R-boats near the Orne River mouth was broken up in the first week of the month; off Cherbourg an enemy convoy was attacked—one escort ship was sunk and several trawlers sunk or damaged. A week later one of the flotillas attacked a convoy off St. Malo. Two merchantmen were sunk, one escort vessel left in flames, and several others damaged. Intercepting a convoy a few days later, Canadian ships set one E-boat afire and damaged several others.

This month official announcement was made of an agreement entered into by the governments

of Canada and the United Kingdom last year. Sixteen British-built corvettes are being given to the R.C.N. in exchange for 16 "Algerine" class fleet mine-sweepers made for the Royal Navy in Canadian shipyards. Twelve of the British ships are to be of the much-improved "Castle" class, a type new to Canada. The eighth of this group, H.M.C.S. *Kincardine*, has recently been commissioned, leaving only four more to come. Already commissioned and in use are four British-built corvettes of the revised "Flower" class.

A new R.C.N. training base has been established in Bermuda, to be commissioned as H.M.C.S. *Somers' Isles* on August 1. It is to be used for "working up programs" for ships which are newly constructed or have undergone a long period of refitting after service at sea. Because of the year-around warm climate, it will be possible at all times to give instruction in sheltered waters in such essentials as abandoning ship, sending away boarding parties and boat pulling. Instruction in swimming, life-saving and physical training will also be carried on to a considerable degree.

Royal Canadian Air Force.

—After the record month of June in which the R.C.A.F. bomber command made 3,000 sorties to drop 10,000 tons of explosives—almost as great a tonnage as dropped during the whole of 1943 by the R.C.A.F.—the Canadians swept into July with new records.

In addition to the bombing done in support of the Normandy offensive, heavy raids were made on robot bases, rail centres throughout France, and German industrial centres. During the first stage of the British and Canadian thrust past Caen, every R.C.A.F. squadron was represented. More than 1,000 Canadian fliers were with the bomber group that hit Hamburg on the night of July 28. Fourteen Canadian squadrons took part, with a loss of 23 aircraft—the heaviest loss since the formation of the Canadian bomber group more than a year and half ago.

Some of the most outstanding work of the month has been the close co-operation between the rocket-firing Typhoons and the army. In the battle for the airfield at Carpiquet, the Germans held one end of the airfield and were giving the allies considerable trouble from a dugout in which 17 tanks were massed,

only about 150 or 200 yards away from Canadian-held positions. A group of R.C.A.F. Typhoons were assigned the task of blowing up the enemy tank nest. Diving in at more than 400 miles per hour through heavy flak, they launched their rockets over the heads of both armies and pulled out of their dives just in time to avoid the exploding debris.

On the night of July 2 an R.C.A.F. Spitfire wing shot down 19 Nazi planes. A few nights later Canadians were with the Beaufighters that sank two merchant ships off the Frisian Islands. Ten of a group of 12 FW190's were destroyed by a Spitfire squadron on July 13. Canadians also have been active in the destruction of enemy aircraft over Normandy; on one day the R.C.A.F. total was 12.

Plans for R.C.A.F. participation in the Pacific war against Japan were forecast by the announcement that a group of officers had left for Royal Air Force headquarters in southeast Asia to carry out a survey of tropical conditions for air fighting. Their object is to acquire information which will be of use to the R.C.A.F. should it be called upon to operate under unfamiliar climatic conditions.

Victoria Cross Awards.—

Two awards of the Victoria Cross, highest British decoration for valor, were made to Canadian officers during July. The first went to Major John Keefer Mahony, 33, of New Westminster, British Columbia, who is serving with the Westminster Regiment (Motor). The award was made for great gallantry while leading his company in establishing and holding an important bridgehead across the Melfa River in Italy, May 24.

The second Canadian V.C. of the month was awarded posthumously to Flight Lieutenant David E. Hornell, 34, of Mimico, Ontario—first member of the R.C.A.F. to win it. The award was made for great gallantry and devotion to duty during a successful attack on a German submarine in the Arctic off Iceland, after his plane had been severely damaged by gun fire.

The flaming plane was brought down masterfully on 12-foot waves and the crew took to rubber dinghies. One exploded leaving a four-man boat for the eight survivors. Heavy seas prevented rescuers from reaching the boat for 21 hours. Shortly before they arrived, Hornell lost consciousness and later died.

ALLIED "INTERNATIONAL" FRONT



Canadians with Allies in Italy

On a jagged line stretching 170 miles across Italy army units of at least 10 different nationalities are fighting the Nazis. Under allied fire are key points of the German Gothic Line, extending from the Massa-Carrara area, north of Florence, to the Adriatic near Rimini.

By July 31 the United States Fifth Army had taken the southern part of Pisa and was striking along the Arno River. Florence was under attack by Eighth

Army troops from Canada, New Zealand, South Africa, India and the United Kingdom.

British forces were pushing north of Arezzo, helped by Indian troops who held the mountainous regions to the east. Italian forces were advancing near the Adriatic. Polish soldiers were driving up the coast.

Also in Italy but not known to be in the front line by the end of July are French Colonial troops and a Brazilian force.

CANADIAN WAR PRODUCTION

	1940*	1941	1942	1943	Total
Aircraft—Number produced...	904	1,699	3,781	4,133	10,517
Weight in short tons, without engines.....	870	2,179	8,789	10,044	21,882
Vehicles—Mechanical transport	70,000	119,000	192,000	175,000	556,000
Armored vehicles and tanks	0	3,000	12,500	15,500	31,000
	70,000	122,000	204,500	190,500	587,000
Guns—Barrels, carriages and mountings numbered as separate units.....	150	7,000	31,000	45,000	83,150
Small Arms—including machine guns.....	1,400	27,000	325,000	580,000	933,400
Heavy Ammunition and Projectiles—Complete rounds, filled.....	0	1,200,000	28,000,000	30,000,000	59,200,000
Plus: Empty cartridge cases for export **.....	958,000	4,455,000	15,025,000	18,323,000	38,761,000
Empty shells for export **.	0	3,000	1,356,750	887,000	2,246,750
Small Arms Ammunition—Millions of rounds.....	112	390	1,200	1,500	3,202
Chemicals and Explosives—Net output in tons.....	13,500	145,000	430,000	500,000	1,088,500
Shipbuilding: ***					
Cargo Vessels—					
Number.....	0	1	81	150	232
Tonnage.....	0	10,350	838,350	1,478,000	2,326,700
Naval Vessels and Patrol Boats	16	123	117	100	356
Other Vessels and Special Purpose Craft.....	0	0	35	447	482
Instruments and Communications Equipment.....	\$3,000,000	\$14,800,000	\$82,000,000	\$164,000,000	\$264,000,000

*Includes last four months of 1939.

**In addition, cartridge cases and other ammunition components have been produced and filled for export as components.

***In addition, to end of 1943 a total of 345 small craft with power, and 3,199 small craft without power, were produced.

ESTIMATED VALUE OF CANADIAN WAR PRODUCTION

(Millions of Dollars)

	1939-40	1941	1942	1943	Total
Aircraft (including overhaul)	45	110	232	368	755
Armored Fighting Vehicles (including tanks)	21	155	218	394
Mechanical Transport	119	198	368	429	1,114
Cargo and Naval Vessels (including repair)	27	102	256	421	806
Chemicals and Explosives (including ammunition filling)	2	54	136	151	343
Guns and Small Arms	1	20	157	199	377
Gun Ammunition (including bombs)	14	95	218	193	520
Small Arms Ammunition	2	16	39	74	131
Instruments and Signals	3	15	82	164	264
Miscellaneous Military Stores (including clothing, personal equipment, food-stuffs, fuel, etc.)	97	181	412	521	1,211
TOTAL	310	812	2,055	2,738	5,915
Defence construction and certain other construction let by the Department of Munitions and Supply	94	138	219	194	645
Plant expansion, government financed* (including machinery and equipment)	112	255	210	222	799
TOTAL	516	1,205	2,484	3,154	7,359
Deliveries on orders placed abroad	60	104	140	322	626
GRAND TOTAL	576	1,309	2,624	3,476	7,985

NOTE: These figures cover only war production and construction on orders placed by the Department of Munitions and Supply.

Deliveries of war exports placed through other government and private agencies are excluded.

*These figures include approximately \$63,000,000 of contracts negotiated by the United Kingdom Technical Mission.

CHEMICALS AND EXPLOSIVES



ONE of the largest, most intricate and most interesting of all the war programs in Canada has been the mushrooming of half a hundred chemicals and explosives projects scattered across the country. Their construction and operation required higher skill, greater learning and wider experience than perhaps any other industrial war program. The results have been Canada's ammunition-filling program and the production of plastics, paints, dopes, varnishes, grease-removers, medicinal preparations, synthetic rubber and thousands of other essential war

items. The war has turned Canada into one of the major chemical producers.

At the beginning of the war Canada's big problem was this—the construction and administration of five explosives plants, each to cost from \$2,500,000 to \$18,200,000; four chemicals plants to cost from \$1,300,000 to \$9,100,000; the erection of four shell-filling plants to cost from \$6,000,000 to \$19,000,000; and the erection and later supervision of more than 40 subsidiary or complementary projects, including nine magazine depots, each involving expenditures run-

ning up to \$1,000,000. Of these 50 projects, all long since completed, only nine are privately owned. The remainder are owned by the people of Canada.

All told these new plants cover an area equal to that of the city of Montreal. The whole program involved an expenditure of approximately \$150,000,000 on properties owned by the Dominion, excluding the \$48,000,000 synthetic rubber plant.

Chemical Research.—During the first two years of war when the major part of the construction work was in progress, extensive and successful chemical research was carried out in a variety of fields to meet the urgent need for modified types of explosives, and for the means of producing British ammunition and explosives from the raw materials and manufacturing processes available on this continent.

The program was not merely confined to the production of the chemicals required for the explosives. There were the techniques of shell filling to be learned and learned rapidly. Experts had to be sent to England for this purpose.

This is only a glancing summary of the tremendous scope of the program yet it speaks wonders for the brilliance and hard work of Canadian scientists.

Canadian Production.—As a result of all these efforts, Canada had filled to the end of 1943 some 100,000,000 rounds of gun ammunition, smoke boxes, pyrotechnics, grenades, mines, depth charges, flares, bombs, etc., as well as hundreds of millions of rounds of small arms ammunition. The total production of filled gun ammunition on the same date stood at 59,000,000 rounds. In addition there has been a very substantial output of filled and unfilled cartridge cases and shells, filled detonators, filled fuses and other ammunition components.

Canadian explosives are used on every fighting front in myriads of forms. For example, Canada manufactures and fills some 25 types of gun ammunition including bombs and grenades. There are also produced many varieties of small arms ammunition, mines, depth charges and similar missiles as well as 70 basic types of pyrotechnics in-

cluding flares and practice bombs.

At its peak, production was running at the rate of some 10,000 tons of chemicals and explosives each week. All told, chemicals and explosives produced since the beginning of the war total more than 1,000,000 tons.

Canadian Developments.—

In the development of new processes and products Canadian scientists have played a big part. One scientist did research which resulted in the immediate introduction into Canada and later in the United States, of a more rapid and efficient means of producing RDX, the new super explosive. In addition Canadians developed new uses and methods of employing this, the first major advance in explosives in many years.

Canadian chemists developed methods of utilizing wood pulp instead of cotton linters in the manufacturing of nitrocellulose used in gunpowder. A new technique was also developed for the production of TNT from existing equipment. A new process in the conditioning of nitrate fertilizer was worked out with the

result that in July, 1943, a large output of fertilizer was available for distribution in the United States, Canada and other countries of the British Commonwealth. From this development Canadian farmers will continue to benefit after the war.

Various explosives and propellents have been developed to meet the needs of the individual allies. Canadian chemists have contributed explosives used in various types of rockets.

To meet the enormous increase in demand and still to maintain an equitable civilian supply a chemicals control was set up early in the war. Since its inception this control has broadened in scope until it now takes in more than 300 items.

Alcohol.—In November, 1942, the control took over the production of all Canadian distilleries. The distillation of high proof alcohol for potable purposes was discontinued. Distilleries which had been manufacturing alcohol from molasses were given assistance in changing their plants over in order to use grain as a raw material and to increase production. Because

of the difficulty of transporting molasses from the West Indies the use of wheat became essential. The production of industrial alcohol in Canada is adequate for all domestic requirements and large quantities have been shipped to war industries in the United States.

Coal Tar.—Late in 1941 it became apparent that there would be a shortage of coal tar for the production of coal tar pitch and pitch coke required in the aluminum, electro-chemical and abrasive industries. At that time some 5,000,000 gallons per year were being used as fuel in a large steel plant. By diverting this supply to the tar distillery industry and using other fuel, some relief was obtained. However, it became necessary to prohibit the use of coal tar in the construction and maintenance of roads and airport facilities. This restriction made available an additional 6,000,000 gallons per year for essential use.

These savings, together with imports of coal tar and coal tar products from the United States, provided an adequate supply in Canada during 1943.

Coal tar by-products which

are of strategic industrial importance for their use in making plastics, in oil refining, in disinfectant manufacture, etc., were also put on an allocation basis.

Glycerine.—To meet the demand for glycerine for the manufacture of cordite it became necessary to import from the United States early in 1941. With similar demands from the United Kingdom and later from Russia, the glycerine situation became critical in all allied countries by the middle of 1941.

In Canada civilian use was restricted to 70% of the 1940 level and later still further to 40%. At the same time, efforts were made to increase production by recovering glycerine previously wasted and by improving the efficiency of existing plants. At the beginning of 1944, glycerine was in much easier supply and all restrictions were removed.

Plastics.—From coal, air and water; from cow's milk; from limestone, natural gas and salt; from wood and acetic acid and from various other sources; scores of plastics, many of them from the magician's wand of the war-

time chemist, are doing their share in the war.

Not only as a substitute for such scarce materials as metals, rubber, and silk, but also as a means for speeding up the production of complex shapes and parts, plastics are being used so extensively that some are now almost as scarce as the materials they are intended to replace. One example of this shortage is nylon. Instead of being used for women's stockings, it is being woven into parachutes.

Before becoming periscope housings, warplane windshields, bullet tips, army badges and buttons, instrument panels or any of tens of thousands of shapes, parts, and articles now made synthetically, plastics are in powder form. Squeezed into moulds under tremendous pressure and at high temperature, the powder undergoes great physical change and emerges as the finished article or part.

An instance of the development of plastics is the manufacture of raincoats for Canada's armed forces from limestone, coke and salt. The plastic powder is transformed into a resin which is dissolved into a suitable pigment to give it the navy

blue, khaki, or air force blue color. This coating composition is then applied to a cotton fabric and the material is ready for use.

Sulphuric Acid.—Sulphuric acid was one of the first materials requiring action in the early days of the chemical control. Explosive plants were coming into operation and additional acid was required for other war industries and essential civilian use. Rationing was considered but as sulphuric acid is one of the most difficult materials to allocate, entering as it does into almost every industry, measures were taken to augment the supply.

At one time in the explosives industry large quantities of weak and impure sulphuric acid were allowed to run to waste. New methods were introduced and the weak acid was reconcentrated for re-use in the plants. Existing facilities for making sulphuric acid were doubled in capacity and transportation of acid from British Columbia to eastern Canada was arranged. As a result of these measures and the easing of the demand in 1943, government-owned plants are now able to divert substantial quantities to fertilizer plants and other civilian industries.

BLOOD GOES TO WAR

MEN who fought at El Alemein, Dieppe, Sicily, and now in France all tell the same story of the miracles performed by blood transfusions. Dried blood serum is stored on all ships at sea. Transfusions are given in planes when they hit the home runway before a man is moved from the cockpit. Bottles are hooked to the sides of ambulances bound for base hospitals and a man is kept alive to receive surgery—his extra chance to come back.

Shortly after the outbreak of war, work on the preparation of this serum for use in the treatment of the condition known as "shock" following severe injury and haemorrhage, was begun. The laboratory process of preparing the blood is accomplished in such a way that the dried serum can quickly be dissolved and restored to its original volume by an appropriate amount of sterile water. The drying of serum requires very special equipment as well as the services of skilled staff.

Volunteer Canadian Red Cross workers sterilize the blood donor sets and get them ready for use

in the clinics. Donating blood is a personal form of war service which may be given by any able-bodied individual between the ages of 18 and 60.

Sometimes it takes as many as 12 bottles of the dried serum to keep a fighting man alive when he has been gravely wounded. Mixed with sterile water the blonde-colored dried blood powder flows into a patient's veins and the results are swift and heartening.

Dried blood serum can be stored safely for years. It can be kept under all climatic conditions without deteriorating.

Since the inception of blood donor service in January, 1940, the following donations have been made at Canadian Red Cross clinics:

Year	Donations
1940.....	5,325
1941.....	33,981
1942.....	181,091
1943.....	529,635

In the six months from January 1 to June 30, 1944, there were 532,992 donations, more than the total for any previous 12 months.

CANADA'S HARVESTING NEEDS



CANADIAN farmers, anticipating one of the largest crops in history, are faced with an increasingly severe labour shortage. With crop conditions excellent in all parts of the country, one of the prime needs of Canada's wartime economy during the next few months is thousands of additional agricultural workers.

It is estimated that 400,000 men and at least 100,000 women have left the farms since 1939. This represents a decrease of 23% in farming personnel. Agricultural output has nevertheless been increased by 50% during the last four years and Canada now ranks third in the world in the production of foodstuffs. Already one of the main suppliers of food to the armies of the

United Nations and to the people of the United Kingdom, Canada's major contribution to the United Nations Relief and Rehabilitation Administration is expected to be in the form of vital foodstuffs. A large part of the Canadian mutual aid appropriation is now devoted to purchase of food for the United Nations.

Dominion-Provincial Co-operation.—The federal and provincial governments are working closely to ensure the maximum amount of farm help. Agreements signed by the federal government and each of the nine provinces have resulted in Dominion-provincial farm labour programs throughout the country.

Purpose of the agreements is the provision of federal financial assistance in recruiting, placing and transporting agricultural workers within each province. The costs are shared on a 50-50 basis by the federal and provincial governments. Up to a total of \$523,000 has been agreed on as the Dominion's share of the joint expenditures.

In addition to this assistance to the provinces, a number of interprovincial transfers of farm labour have been arranged—these are paid for wholly by the Dominion. A sum of \$300,000 has been provided for this purpose.

Transfers. — Two interprovincial movements have already been put into effect. About 200 women from Alberta and Saskatchewan have been taken to British Columbia to help with fruit picking. Close to 850 fully-trained farmers from the prairie provinces have been brought to Ontario to help with the earlier harvest in this part of the country. In all cases these men will return to the west in time to take part in the later harvesting there.

In addition it is planned that near the end of August a large number of men from Ontario

and Quebec, including industrial workers in low priority jobs or those who can be spared temporarily from factories, will be taken west to assist with the harvest. Last year the movement was confined to Ontario and about 3,700 farmers from the province were transferred. In 1942 because of the exceptionally late harvest, a considerable number of university students from the east were sent west during October.

This summer for the first time, women and girls in Ontario and Quebec who are from prairie farms and who wish to return to help with the harvest may take advantage of the low excursion fares. Other girls with farm experience may also go west provided they have a letter from some farmer requesting their services.

As crops are advanced in all parts of the country this year, the labour shortage is being felt earlier than usual. In parts of Manitoba and southeast Saskatchewan wheat is already being cut. In central Canada there is a need for workers in all branches of agriculture, particularly for fruit-picking, tobacco harvesting, canning and mixed farming. In the Maritime Prov-

inces the main need is for men to help pick apples in Nova Scotia and to assist with the potato crop in New Brunswick and Prince Edward Island. A transfer of men from the Gaspé region to the Maritimes is being considered.

Where workers are being moved from one province to another under organized excursions, the railway companies have offered the Department of Labour a considerable reduction in fare. The return journey is given for the price of a single ticket. In all cases the federal government pays the costs of transportation with the exception of a small charge made to each person for the return journey. Travelling from west to east workers must each provide \$5 toward their return fare; from east to west the charge is \$10, as farm wages are higher in the west than in the east. They must also provide for their own meals during the trip.

People transferred under interprovincial labour arrangements are paid the prevailing wage rates by the farmer for whom they are working. The government neither pays nor guarantees wages. If, however, there is any dissatisfaction in the

matter of wages, complaints may be submitted to the district representative in charge of placement.

Local Appeals.—Appeals have been made by the Department of Labour to civilians of all types, whether or not they are experienced, to help with agricultural work in their communities. Intensive local campaigns are carried on under the farm labour program in towns throughout Canada. Wherever possible labour shortages are handled locally.

In Ontario farm commando brigades have been formed in a number of cities. Men who can devote a few hours a day or even odd afternoons to farm work volunteer their services and are used in nearby farming communities.

In Manitoba particularly, and to some extent in the other prairie provinces, a policy of recruiting Indians from the reserves is being carried out. It is expected that between 600 and 700 Indians will be brought to work on farms during the harvest season.

An appeal to high school boys and girls was issued across Canada early in the summer. In

fruit-growing districts the emphasis is on obtaining their help to save the fruit crop. Otherwise boys and girls are being urged to take whatever kind of farm work that is available and at the same time within their capacity. Boys 15 and over and girls 16 and over are wanted. Special arrangements are made for any who are able to leave home temporarily to take work in other districts. Supervised camps are arranged in some fruit-picking areas by the provincial authorities.

Industry to Help.—Special letters have been sent out to most employers in Ontario, Quebec and the Maritime Provinces requesting that temporary leave be granted to industrial workers to help on farms. The employers are asked to grant leave of absence in writing to men who can be spared for the harvesting and to women willing to help with fruit picking. Any able-bodied man, regardless of his farming experience, will be taken. Employers in Ontario and Quebec are, at the same time, urged to release men to go to the prairies toward the end of August.

Another policy adopted by the Department of Labour, although not calculated to serve as an

emergency measure, is the new industrial mobilization survey which is being conducted in most plants. All men are interviewed and any with farming experience are asked to go back to farming if they can be spared from their work.

As some woods operations are slack during the summer months, Selective Service has issued an appeal requesting the release of men to ease the employment situation on farms as well as in several other types of work, including railway maintenance and the production of base metals.

To facilitate movement across the border of grain threshing outfits together with their combine reapers, reciprocal arrangements have been made by the governments of Canada and the United States. The combines admitted under the agreements cut and thresh grain in one operation, thus saving considerable labour. From July 7, 1944, border crossing formalities were temporarily suspended for combine equipment and crews moving between the prairie provinces and adjacent states. Canadian groups may remain in the United States until September 15. Because of later harvest conditions, United States crews may stay

in Canada until December 31. Similar arrangements have been in effect for the last two years.

Armed Services.—Navy, army and air force headquarters have co-operated with the Department of Labour in granting temporary leave to experienced farm workers. During September and October, 1943, close to 12,000 men representing the three services were working on farms. Most of these were on compassionate farm leave working on their home farms. A group of 2,500 soldiers was also detailed for farm work as part of military duty.

Servicemen on the farms harvested grain on the prairies, put up hay in British Columbia, picked apples, other fruits and vegetables in Ontario, Quebec and Nova Scotia and potatoes in New Brunswick and Prince Edward Island. A special arrangement was made whereby 500 navy men picked apples in the Annapolis Valley.

This year the air force is extending leave to work on any farm, not only on a home farm or that of a relative. In other years, only ground crew were allowed temporary leave, but leave will now be granted to any

member of the R.C.A.F. who can be spared from the service, provided he is not actually undergoing training.

R.C.A.F. and army authorities have extended permission to have every air school and army camp contacted by Selective Service or farm labour officials. These officials make arrangements for men on short leaves to work on nearby farms.

To retain male workers on the farms there have been modifications in the procedures under military call-up regulations. Immediately upon receipt of notice to report for medical examination, a man engaged in essential farm work may apply for postponement instead of taking time to have his medical examination. A letter to his mobilization registrar with confirming recommendations from two prominent citizens will ensure immediate deferment. More than 58% of the total number of postponements are granted farm workers.

Men who have been rejected from the armed services are now interviewed by Selective Service officials and any with agricultural experience are encouraged to return to farms.

When the farm labour shortage became acute in 1943, regulations governing the employment of conscientious objectors were changed to provide that agriculture be given special consideration. Out of a total of slightly more than 7,000 conscientious objectors who have received postponement of military service, more than 5,600 now work on farms.

Use in some sections has also been made of Japanese and prisoners of war. Both have been used particularly in the sugar beet areas around Lethbridge, Alberta. In a couple of regions, a small number of prisoners of war have been employed on individual farms. This, however, is not a general practice.

Farm Machinery.—Early in May it was announced that there would be an ease-up on metal for the manufacture of spare parts for farm machinery and of certain types of machinery essential to Canada's production of foodstuffs. This has been helpful to farmers whose equipment was beginning to give out. Manufacturers are also producing additional tonnage for establishment of war veterans on the land and for Canada's contribution of farm machinery for post-war rehabilitation purposes.

Removal of customs duties on agricultural implements and parts as announced in the 1944 budget is not expected to have much effect until next year.



REFUGEE INDUSTRY IN CANADA

SINCE late in 1938 many refugees have come to Canada, bringing with them specialized industrial knowledge, much of it new to this country. Replies to a questionnaire forms the basis for a study of 45 refugee industries. These 45 represent the great majority of them.

Most of the refugees come from Czechoslovakia, though Germans, Poles, Belgians, Romanians, Hungarians, Netherlands and French are also represented.

In most cases they have set up plants to produce goods which they have produced be-

fore. But the exigencies of war have forced many of them—as it has forced many Canadian manufacturers—to change over from their normal to wartime production. Of the 45 industries studied, only 16 are engaged full-time on civilian production. Eleven are doing 100% war production. The rest are turning out from 7 to 95% war materials.

More than half these industries are introducing new skills, new techniques or new products to Canadian economy. It may be the special curing and canning of hams; new types of wooden and ceramic jewelry; a special method of moulding plywood for aircraft parts; a technique of processing hemlock, formerly used only for pulp, into usable flooring, shelving and lumber. It may be a method of reclaiming old files, so that they can be used again and again; or a special weaving technique; or a new way of cleaning forage seed; or novelties like wall-pockets or a certain kind of curtain track or a new line in pottery. It may be the introduction of fully automatic glass manufacture, or the first factory to cut and polish diamonds for tools. It may be a special chemical or pharmaceutical product.

Nearly 5,000 workers are employed by these industries, 87% of them Canadians, and the total annual payroll is \$6,727,000. Only five industries have union contracts but they are the five which employ more than half the total number employed by all the 45 industries. Total capital investment comes to \$7,663,000, and nearly all of it is held by the immigrants who own the industries.

The five biggest industries—producing from \$1,000,000 to \$9,000,000 worth of goods each a year—are turning out 80 to 100% war materials. These include instruments, hydraulic equipment, jigs, fibre shell containers, army boxes and cases, and meat products for the armed forces. Smaller industries are turning out for war purposes flax line fibre, cutting oil, hardening compounds, army and air force clothing, plane and gun parts, wooden spacers and dividers for bomb carriers, precision tools, signal flags, powder bags, gauges, dies and moulds.

The majority of these industries have settled in the east: 26 in Ontario, 17 in Quebec, and one each in Saskatchewan and British Columbia.

WOMEN



Navy.—Two years ago the Royal Canadian Navy was an all-male service. Ships and shore establishments alike were manned by men. Knitting seamen's stockings or collecting magazines for ships' crews at sea were about the total contributions made by women in naval auxiliary organizations.

Since its inauguration in June, 1942, and its first training class in August of the same year, the Women's Royal Canadian Naval Service now has a total enlistment of more than 5,400. Its members have taken over shore duties and sent thousands of sailors to serve with their ships. No longer is it a novelty to find an officer or rating in the Wren

uniform handling a job that used to be done by men.

All new entries in the W.R.C.N.S. report to H.M.C.S. *Conestoga*, commissioned as a training ship in the Royal Canadian Navy at Galt, Ontario. Actually composed of modern brick buildings, *Conestoga* accommodates about 400 probationary Wrens at a time for their four weeks' basic course.

Wrens are serving at 50 different naval bases and establishments throughout Canada, Newfoundland, the United Kingdom and in the United States at New York and Washington. They are handling more than 30 different kinds of work. Of these about 250 are commissioned officers

who receive their commissions upon graduating from an officers' training course at Ottawa.

Two new naval barracks have been opened for Wren quarters, one at H.M.C.S. *Carleton* in Ottawa and the other at

H.M.C.S. *Chippewa* in Winnipeg. The new quarters at Ottawa have been taken over to meet the demand for accommodation of increased complement of Wren stenographers in various branches at headquarters.

ARMED FORCES

	Enlistments to August, 1944	
Women's Royal Canadian Naval Service.....	more than	5,400
Canadian Women's Army Corps.....	" "	17,887
Royal Canadian Air Force (Women's Division).....	" "	16,800
Nursing Services.....		3,707
Women doctors in armed services...		48
Total.....	more than	43,842

Army.—Three years old this month, the Canadian Women's Army Corps, which was established in August, 1941, now has a total enlistment of slightly under 18,000.

Recently it was announced that warrant officers of the C.W.A.C. are to have a seven weeks' course in army administration. This is the first course of its kind and is designed to teach general army routine to the senior non-commissioned officers. The first four weeks of this new course are spent at the Canadian army administration school at Brockville, Ontario.

After this, the trainees will go to the basic training centre at Kitchener, Ontario, where for three weeks they will receive regimental instruction as well as practical experience in handling female personnel.

Appointment of another C.W.A.C. lieutenant-colonel brings to four the number serving under the recently appointed director-general.

Latest training project for this service is a course in English for French speaking personnel at the basic training centre at Kitchener, Ontario. New recruits will be sent on the course

prior to taking their basic training, while others in the corps whose efficiency may be improved by a better knowledge of English will be released from their working units for the seven weeks' training period.

Air Force.—The Women's Division of the Royal Canadian Air Force is part of Canada's blueprint for victory—a print in air force blue. First of the women's services to be formed, it marked its third birthday on July 2 of this year. Organized by order-in-council dated July 2, 1941, it became a component of the R.C.A.F. in February, 1942.

By August, 1944, more than 16,800 women had enlisted in this service and they serve from Newfoundland to Prince Rupert on the coast of British Columbia. Members of the division are also serving in the Bahamas and at three posts in the United States and nearly 1,000 are serving overseas at London headquarters or at units of the R.C.A.F.

Almost 1,000 women are serving in the division who come from countries outside Canada. The majority of these are from British Commonwealth and Em-

pire countries—Newfoundland, United Kingdom, New Zealand, Australia, British West Indies, Jamaica, Bermuda and the Barbadoes. The second greatest number, 150, is from the United States.

The shoulder flashes also show such countries as Switzerland, Czechoslovakia, France, Argentina, the Ukraine, Mexico and the Netherlands. Seeking to serve against a common enemy, these women have found their way to Canadian recruiting centres and have promised to serve for the duration in a multitude of capacities.

The purpose of the division—to replace men in ground duty work so far as possible—has been successfully fulfilled. Approximately 43 trades are now open to women varying from stenography and cooking to such technical trades as instrument mechanics and photographic interpretation.

One of the big problems confronting organization officers was the housing of the more than 1,000 airwomen serving at R.C.A.F. headquarters in Ottawa. This has been solved in two ways. Some airwomen, because of their unusual hours of duty and distance from work, are

allowed to live out. The majority, however, live in a barracks—one of the largest single-unit barracks in Canada. It was built to provide adequate sleeping, messing, recreation and living quarters for 800 personnel. In recent months, through permission of the officer commanding, the airwomen elect representatives to an airwomen's council which has wide power in the management of their internal affairs. Each resident has the right to propose any measure of reform or change which she wishes. At meetings, elected representatives bring forward the suggestion of their "constituents." When approved by the council and with the consent of the officer commanding, the suggestions are incorporated into the regulations governing management. It is an experiment in self-government which has engendered a unity unique in barracks life.

Medical Services.—By August, 1944, there were 3,707 women in the nursing services of the armed forces. In the Royal Canadian Navy nursing service were 264; in the Royal Canadian Army Medical Corps, 3,057 of whom 1,923 nursing sisters are

serving overseas; and in the Royal Canadian Air Force, 386, of whom 36 are serving overseas. There are 48 women doctors in the armed forces—five in the navy, 32 in the army, and 11 in the air force.

Women's Voluntary Services.—Despite the great numbers of Canadian women who are doing valuable volunteer work, the demand still exceeds the supply. This is especially true during the warm summer months when housewives and mothers carry the added burdens of canning season and children free from school and when they themselves are in need of a holiday.

Many social agencies, such as children's welfare and family agencies, are conducting summer camps for children and young people. Volunteers are still needed to instruct in hobby huts, dramatics, music and physical training for the 12 days' duration of the camp.

Armed forces canteens, playgrounds, summer nurseries and kindergartens are doing heavier work than ever. Both the Y.M.C.A. and the Y.W.C.A. as well as various church groups have organized "holidays at

home" groups. These projects need volunteer help as do many others. Organized entertaining for armed forces, work with repatriated troops, helping new English brides find their place in this adopted land, information bureaus and rest centres at railway stations, magazine collection centres, the compilation and dissemination of local news for troops away from home, victory garden surveys, these are but a few. The Department of Agriculture wants volunteers for publicity and demonstration of up-to-date canning methods. Communities need to be made aware of the shortage of harvesters for their local crops and need organizers to recruit workers on week-ends and half holidays.

Day Nurseries.—Under the Dominion-provincial plan for wartime day nurseries there are now in operation in Ontario 21 day nurseries, six kindergarten units and 37 school centres. In Montreal there are six day nurseries.

In Oshawa, Ontario, provision has been made for the opening during the summer of the kindergarten room and the library in one school to provide for the

children of kindergarten and school age respectively so their mothers may continue working. The membership of the local day care committee has enlarged and it is expected that these two projects will be continued when school reopens in the fall.

An additional day care unit for school children has been organized at a Toronto school and arrangements made for the children to have their noon meal in the same building which houses one of the wartime day nurseries.

War Emergency Training.

—Four years ago a war emergency training program was set up by the Department of Labour to supplement the number of trained industrial workers to cope with the national emergency. By July, 1944, 50,545 women had been enrolled since the beginning. There were 130 in full-time industrial classes and 29 in part-time classes. In plant schools 450 women were taking full-time classes. This made a total of 609 enrolled in 100 plant and industrial training schools by July. Of a total 209 students newly enrolled during June in full-time industrial classes 32% were women.

VOCATIONAL TRAINING

ON April 1, 1944, war emergency training began its fifth year of operation. It is now part of the broader program known as Canadian vocational training, which includes Dominion-provincial projects for youth training, assistance to students, co-operative apprenticeship agreements with various provincial governments and any other form of post-war training which may be approved later.

From its inception up to April 30, 1944, the gross enrolment under war emergency training and assistance to students has been as follows:

Training in industry...	217,815
Navy tradesmen.....	7,586
Army tradesmen.....	41,080
Air force tradesmen....	64,936
Rehabilitation (persons discharged from the forces).....	3,264
Students.....	5,373
Total.....	340,054

The enrolment as at April 1 stood at 12,362, which was a marked drop from the enrolment of previous months. This was particularly noticeable in the full-time pre-employment classes for industry and in the training for Royal Canadian Air Force

tradesmen. Outside of Quebec and Ontario, only a few dozen trainees were still enrolled in full-time pre-employment classes.

The facilities of the training program have been extended to industries engaged in essential civilian production as well as those engaged in actual war production. Industries to benefit will be determined by the War-time Prices and Trade Board.

Discharged service men and women have not applied in great numbers yet for training. Only 808 veterans were receiving training at the end of April, about 15% in industry, and the remainder in private trade schools, business colleges or in regular war emergency training classes.

The reduction in the number of trainees in full-time pre-employment classes and receiving weekly training allowances is reflected in the decrease in cost. The total payments made by the Dominion up to April 30, 1944, for the fiscal year ending March 31, 1944, were approximately \$4,530,000, compared with payments of \$6,115,000 for the fiscal year 1942-43.

IN addition to CANADA AT WAR, certain other reference material dealing with various aspects of Canada's war effort is available in limited quantities on request. It may be obtained by writing to the Wartime Information Board, Ottawa. Such material includes:

Reference Papers (issued irregularly)—Recent numbers deal with:

- The Royal Canadian Navy.
- Canada (its geography, population, history, constitution and war effort).
- Canadian Prisoners of War.
- Canadian Food and Agriculture in the War.
- Canadian War Service Voting Regulations.
- Canadian Schools and Universities in Wartime.

Facts and Figures Weekly—a summary of Canadian events regarded as significant.

Airmail Bulletin—a daily summary of developments in Canadian public affairs, prepared for distribution among Canadian offices abroad. It is available to Canadian business houses desiring to forward it to their overseas representatives.

Postwar Planning Information (issued fortnightly)—a continuing survey of post-war planning in Canada.

Consumer Facts—a monthly bulletin of background information designed especially for teachers of home economics, writers, broadcasters and group teachers. It summarizes government orders affecting consumers.

Home Front Bulletin—a weekly bulletin containing current information of interest to women. It is designed for display purposes in schools, libraries, club-rooms, etc.

Canadian Affairs—a bi-monthly educational service for the armed forces in Canada and overseas, with a limited civilian distribution. Among home edition articles available are:

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| Future for Fighters. | Price Controls for Victory. |
| The New North. | Our Latin-American Neighbors. |
| Canada as a Pacific Power. | A Film Policy for Canada. |
| Canada—World Trader. | Canada and the U.S.S.R. |
| Canada and the Post-War World. | Wealth in Wood. |
| People on the Land. | The Prairie Provinces. |
| Canada's Constitution. | Power for Prosperity. |

Canadian Affairs Pictorial—a monthly pictorial sheet (24 by 36 inches) supplementary to CANADIAN AFFAIRS, with a limited civilian distribution. Pictorials available include:

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| Canadian Agriculture. | The New North. |
| Canada—World Trader. | Wealth in Wood. |
| Controls for Victory. | Western Canada. |
| Movies for the Millions. | |

Graphic Sheet Series—in which various problems are dealt with for the benefit of industrial workers and trade union members; for use as enclosures, pay envelope stuffers, pin-up sheets, etc. Among issues available are those on:

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|-------------------------|-------------------------------|
| Income Tax. | Inflation. |
| Unemployment Insurance. | Labour-Management Committees. |
| Industrial Health. | V.D. in Industry. |

A. J. P. June.

The Wartime Information Board is co-operating with other government departments in conserving paper because of the present serious shortage. Therefore, if you find that this publication is of little use to you, please notify the Distribution Section, Wartime Information Board, Ottawa, and your name will be removed from the mailing list.

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